Title: Fermionic Basis of Local Fields in the Sine-Gordon Model

Date: Aug 16, 2011 09:30 AM

URL: http://pirsa.org/11080048

Abstract: In this talk we give a survey of recent developments concerning the fermionic structure in the sine-Gordon model. For the lattice counterpart (6 vertex model), we introduce fermions acting on the space of (quasi) local operators. The main theorem is a determinant formula for the expectation values of fermionic descendants of primary fields. In the continuum limit this construction gives rise to a basis of the space of all descendant fields, whose expectation values take a very simple form. Unexpectedly, it turns out that the action of our fermions on form factors coincides with yet another fermions which have been introduced some time ago by Babelon, Bernard and Smirnov.

Ferminoic Basis of Local Fields in the sine-Gordon Model

Michio Jimbo (Rikkyo University, Japan)

Integrability in Gauge/String Theories
Perimeter Institute, Waterloo
August 16, 2011

Ferminoic Basis of Local Fields in the sine-Gordon Model

Michio Jimbo (Rikkyo University, Japan)

Integrability in Gauge/String Theories
Perimeter Institute, Waterloo
August 16, 2011

Ferminoic Basis of Local Fields in the sine-Gordon Model

Michio Jimbo (Rikkyo University, Japan)

Integrability in Gauge/String Theories
Perimeter Institute, Waterloo
August 16, 2011

Ferminoic Basis of Local Fields in the sine-Gordon Model

Michio Jimbo (Rikkyo University, Japan)

Integrability in Gauge/String Theories
Perimeter Institute, Waterloo
August 16, 2011

Ferminoic Basis of Local Fields in the sine-Gordon Model

Michio Jimbo (Rikkyo University, Japan)

Integrability in Gauge/String Theories
Perimeter Institute, Waterloo
August 16, 2011

Ferminoic Basis of Local Fields in the sine-Gordon Model

Michio Jimbo (Rikkyo University, Japan)

Integrability in Gauge/String Theories
Perimeter Institute, Waterloo
August 16, 2011

Ferminoic Basis of Local Fields in the sine-Gordon Model

Michio Jimbo (Rikkyo University, Japan)

Integrability in Gauge/String Theories
Perimeter Institute, Waterloo
August 16, 2011

Ferminoic Basis of Local Fields in the sine-Gordon Model

Michio Jimbo (Rikkyo University, Japan)

Integrability in Gauge/String Theories
Perimeter Institute, Waterloo
August 16, 2011

The content of this talk is based on the joint work by

H. Boos, T. Miwa, F. Smirnov, Y. Takeyama, M.J.

The content of this talk is based on the joint work by

H. Boos, T. Miwa, F. Smirnov, Y. Takeyama, M.J.

- BJMST, Commun.Math.Phys. **286** 875–932(2009)
- JMS, J. Phys. A, **42** 304018 (2009)
- BJMS, Commun.Math.Phys. **299** 825–866 (2010)
- JMS, Lett.Math.Phys. **96** 325–365 (2011)
- JMS, arXiv 1105.6209

The content of this talk is based on the joint work by

H. Boos, T. Miwa, F. Smirnov, Y. Takeyama, M.J.

- BJMST, Commun.Math.Phys. **286** 875–932(2009)
- JMS, J. Phys. A, **42** 304018 (2009)
- BJMS, Commun.Math.Phys. **299** 825–866 (2010)
- JMS, Lett.Math.Phys. **96** 325–365 (2011)
- JMS, arXiv 1105.6209

The content of this talk is based on the joint work by

H. Boos, T. Miwa, F. Smirnov, Y. Takeyama, M.J.

- BJMST, Commun.Math.Phys. **286** 875–932(2009)
- JMS, J. Phys. A, **42** 304018 (2009)
- BJMS, Commun.Math.Phys. **299** 825–866 (2010)
- JMS, Lett.Math.Phys. **96** 325–365 (2011)
- JMS, arXiv 1105.6209

Plan of the talk

Plan of the talk

- Introduction

Plan of the talk

- Introduction
- 6 vertex model and expectation values

Plan of the talk

- Introduction
- 6 vertex model and expectation values
- Scaling limit to CFT

Plan of the talk

- Introduction
- 6 vertex model and expectation values
- Scaling limit to CFT
- Scaling limit to sine-Gordon model

Plan of the talk

- Introduction
- 6 vertex model and expectation values
- Scaling limit to CFT
- Scaling limit to sine-Gordon model

Plan of the talk

- Introduction
- 6 vertex model and expectation values
- Scaling limit to CFT
- Scaling limit to sine-Gordon model

Plan of the talk

- Introduction
- 6 vertex model and expectation values
- Scaling limit to CFT
- Scaling limit to sine-Gordon model

Plan of the talk

- Introduction
- 6 vertex model and expectation values
- Scaling limit to CFT
- Scaling limit to sine-Gordon model

Plan of the talk

- Introduction
- 6 vertex model and expectation values
- Scaling limit to CFT
- Scaling limit to sine-Gordon model

Plan of the talk

- Introduction
- 6 vertex model and expectation values
- Scaling limit to CFT
- Scaling limit to sine-Gordon model

Introduction

Introduction

We consider the sine-Gordon model

$$\mathcal{L}_{sG} = \frac{1}{16\pi}(\partial_\mu \varphi)^2 - 2m_0^2 \cos \beta\varphi \,.$$

Introduction

We consider the sine-Gordon model

$$\mathcal{L}_{sG} = \frac{1}{16\pi}(\partial_\mu \varphi)^2 - 2m_0^2 \cos \beta\varphi \,.$$

We use the parameters $\nu, \boldsymbol{\mu}$:

$$\beta^2 = 1 - \nu \quad (\frac{1}{2} < \nu < 1)\,, \quad m_0^2 = \frac{\boldsymbol{\mu}^2}{\sin \pi\nu}$$

$$M_{\mathrm{soliton}} = 4C\boldsymbol{\mu}^{1/\nu}, \quad C = \frac{\Gamma\left(\frac{1-\nu}{2\nu}\right)}{2\pi\Gamma\left(\frac{1}{2\nu}\right)}\Gamma(\nu)^{1/\nu}$$

Introduction

We consider the sine-Gordon model

$$\mathcal{L}_{sG} = \frac{1}{16\pi}(\partial_\mu \varphi)^2 - 2m_0^2 \cos \beta\varphi \,.$$

We use the parameters $\nu, \boldsymbol{\mu}$:

$$\beta^2 = 1 - \nu \quad (\frac{1}{2} < \nu < 1)\,, \quad m_0^2 = \frac{\boldsymbol{\mu}^2}{\sin \pi\nu}$$

$$M_{\text{soliton}} = 4C\boldsymbol{\mu}^{1/\nu}\,, \quad C = \frac{\Gamma\left(\frac{1-\nu}{2\nu}\right)}{2\pi\Gamma\left(\frac{1}{2\nu}\right)}\Gamma(\nu)^{1/\nu}$$

Introduction

We consider the sine-Gordon model

$$\mathcal{L}_{\mathrm{sG}} = \frac{1}{16\pi}(\partial_\mu \varphi)^2 - 2m_0^2 \cos \beta\varphi \,.$$

We use the parameters ν, μ:

$$\beta^2 = 1 - \nu \quad (\frac{1}{2} < \nu < 1)\,, \quad m_0^2 = \frac{\mu^2}{\sin \pi\nu}$$

$$M_{\mathrm{soliton}} = 4C\mu^{1/\nu}, \quad C = \frac{\Gamma\left(\frac{1-\nu}{2\nu}\right)}{2\pi\Gamma\left(\frac{1}{2\nu}\right)}\Gamma(\nu)^{1/\nu}$$

Introduction

We consider the sine-Gordon model

$$\mathcal{L}_{sG} = \frac{1}{16\pi}(\partial_\mu \varphi)^2 - 2m_0^2 \cos \beta\varphi \, .$$

We use the parameters ν, μ:

$$\beta^2 = 1 - \nu \quad (\frac{1}{2} < \nu < 1)\, , \quad m_0^2 = \frac{\mu^2}{\sin \pi\nu}$$

$$M_{\rm soliton} = 4C\mu^{1/\nu}, \quad C = \frac{\Gamma\left(\frac{1-\nu}{2\nu}\right)}{2\pi\Gamma\left(\frac{1}{2\nu}\right)}\Gamma(\nu)^{1/\nu}$$

Introduction

We consider the sine-Gordon model

$$\mathcal{L}_{sG} = \frac{1}{16\pi}(\partial_\mu \varphi)^2 - 2m_0^2 \cos \beta\varphi \,.$$

We use the parameters ν, μ:

$$\beta^2 = 1 - \nu \quad (\frac{1}{2} < \nu < 1)\,, \quad m_0^2 = \frac{\mu^2}{\sin \pi\nu}$$

$$M_{\text{soliton}} = 4C\mu^{1/\nu}\,, \quad C = \frac{\Gamma\left(\frac{1-\nu}{2\nu}\right)}{2\pi\Gamma\left(\frac{1}{2\nu}\right)}\Gamma(\nu)^{1/\nu}$$

Introduction

We consider the sine-Gordon model

$$\mathcal{L}_{sG} = \frac{1}{16\pi}(\partial_\mu\varphi)^2 - 2m_0^2 \cos\beta\varphi\,.$$

We use the parameters ν, μ:

$$\beta^2 = 1 - \nu \quad (\frac{1}{2} < \nu < 1)\,, \quad m_0^2 = \frac{\mu^2}{\sin\pi\nu}$$

$$M_{\text{soliton}} = 4C\mu^{1/\nu}\,, \quad C = \frac{\Gamma\left(\frac{1-\nu}{2\nu}\right)}{2\pi\Gamma\left(\frac{1}{2\nu}\right)}\Gamma(\nu)^{1/\nu}$$

Introduction

We consider the sine-Gordon model

$$\mathcal{L}_{sG} = \frac{1}{16\pi}(\partial_\mu \varphi)^2 - 2m_0^2 \cos \beta\varphi \,.$$

We use the parameters ν, μ:

$$\beta^2 = 1 - \nu \quad (\frac{1}{2} < \nu < 1) , \quad m_0^2 = \frac{\mu^2}{\sin \pi\nu}$$

$$M_{\text{soliton}} = 4C\mu^{1/\nu} , \quad C = \frac{\Gamma\left(\frac{1-\nu}{2\nu}\right)}{2\pi\Gamma\left(\frac{1}{2\nu}\right)}\Gamma(\nu)^{1/\nu}$$

Introduction

We consider the sine-Gordon model

$$\mathcal{L}_{\mathrm{sG}} = \frac{1}{16\pi}(\partial_\mu\varphi)^2 - 2m_0^2\cos\beta\varphi\,.$$

We use the parameters ν, μ:

$$\beta^2 = 1-\nu \quad (\frac{1}{2}<\nu<1)\,, \quad m_0^2 = \frac{\mu^2}{\sin\pi\nu}$$

$$M_{\mathrm{soliton}} = 4C\mu^{1/\nu}\,, \quad C = \frac{\Gamma\left(\frac{1-\nu}{2\nu}\right)}{2\pi\Gamma\left(\frac{1}{2\nu}\right)}\Gamma(\nu)^{1/\nu}$$

Introduction

We consider the sine-Gordon model

$$\mathcal{L}_{sG} = \frac{1}{16\pi}(\partial_\mu \varphi)^2 - 2m_0^2 \cos \beta\varphi \,.$$

We use the parameters ν, μ:

$$\beta^2 = 1 - \nu \quad (\frac{1}{2} < \nu < 1)\,, \quad m_0^2 = \frac{\mu^2}{\sin \pi\nu}$$

$$M_{\mathrm{soliton}} = 4C\mu^{1/\nu}\,, \quad C = \frac{\Gamma\left(\frac{1-\nu}{2\nu}\right)}{2\pi\Gamma\left(\frac{1}{2\nu}\right)}\Gamma(\nu)^{1/\nu}$$

Introduction

We consider the sine-Gordon model

$$\mathcal{L}_{sG} = \frac{1}{16\pi}(\partial_\mu \varphi)^2 - 2m_0^2 \cos \beta\varphi \,.$$

We use the parameters ν, μ:

$$\beta^2 = 1 - \nu \quad (\frac{1}{2} < \nu < 1)\,, \quad m_0^2 = \frac{\mu^2}{\sin \pi\nu}$$

$$M_{\rm soliton} = 4C\mu^{1/\nu}, \quad C = \frac{\Gamma\left(\frac{1-\nu}{2\nu}\right)}{2\pi\Gamma\left(\frac{1}{2\nu}\right)}\Gamma(\nu)^{1/\nu}$$

Introduction

We consider the sine-Gordon model

$$\mathcal{L}_{sG} = \frac{1}{16\pi}(\partial_\mu \varphi)^2 - 2m_0^2 \cos \beta\varphi \,.$$

We use the parameters ν, μ:

$$\beta^2 = 1 - \nu \quad (\frac{1}{2} < \nu < 1), \quad m_0^2 = \frac{\mu^2}{\sin \pi\nu}$$

$$M_{\text{soliton}} = 4C\mu^{1/\nu}, \quad C = \frac{\Gamma\left(\frac{1-\nu}{2\nu}\right)}{2\pi\Gamma\left(\frac{1}{2\nu}\right)}\Gamma(\nu)^{1/\nu}$$

Introduction

We consider the sine-Gordon model

$$\mathcal{L}_{\rm sG} = \frac{1}{16\pi}(\partial_\mu\varphi)^2 - 2m_0^2\cos\beta\varphi\,.$$

We use the parameters ν, μ:

$$\beta^2 = 1-\nu \quad (\frac{1}{2}<\nu<1)\,, \quad m_0^2 = \frac{\mu^2}{\sin\pi\nu}$$

$$M_{\rm soliton} = 4C\mu^{1/\nu}, \quad C = \frac{\Gamma\left(\frac{1-\nu}{2\nu}\right)}{2\pi\Gamma\left(\frac{1}{2\nu}\right)}\Gamma(\nu)^{1/\nu}$$

Introduction

We consider the sine-Gordon model

$$\mathcal{L}_{sG} = \frac{1}{16\pi}(\partial_\mu \varphi)^2 - 2m_0^2 \cos \beta\varphi \,.$$

We use the parameters ν, μ:

$$\beta^2 = 1 - \nu \quad (\frac{1}{2} < \nu < 1)\,, \quad m_0^2 = \frac{\mu^2}{\sin \pi\nu}$$

$$M_{\mathrm{soliton}} = 4C\mu^{1/\nu}\,, \quad C = \frac{\Gamma\left(\frac{1-\nu}{2\nu}\right)}{2\pi\Gamma\left(\frac{1}{2\nu}\right)}\Gamma(\nu)^{1/\nu}$$

Introduction

We consider the sine-Gordon model

$$\mathcal{L}_{\mathrm{sG}} = \frac{1}{16\pi}(\partial_\mu \varphi)^2 - 2m_0^2 \cos \beta\varphi \,.$$

We use the parameters ν, μ:

$$\beta^2 = 1 - \nu \quad (\frac{1}{2} < \nu < 1)\,, \quad m_0^2 = \frac{\mu^2}{\sin \pi\nu}$$

$$M_{\mathrm{soliton}} = 4C\mu^{1/\nu}\,, \quad C = \frac{\Gamma\left(\frac{1-\nu}{2\nu}\right)}{2\pi\Gamma\left(\frac{1}{2\nu}\right)}\Gamma(\nu)^{1/\nu}$$

Introduction

We consider the sine-Gordon model

$$\mathcal{L}_{\mathrm{sG}} = \frac{1}{16\pi}(\partial_\mu \varphi)^2 - 2m_0^2 \cos \beta\varphi \,.$$

We use the parameters ν, μ:

$$\beta^2 = 1 - \nu \quad (\frac{1}{2} < \nu < 1)\,, \quad m_0^2 = \frac{\mu^2}{\sin \pi\nu}$$

$$M_{\mathrm{soliton}} = 4C\mu^{1/\nu}\,, \quad C = \frac{\Gamma\left(\frac{1-\nu}{2\nu}\right)}{2\pi\Gamma\left(\frac{1}{2\nu}\right)}\Gamma(\nu)^{1/\nu}$$

Introduction

We consider the sine-Gordon model

$$\mathcal{L}_{sG} = \frac{1}{16\pi}(\partial_\mu \varphi)^2 - 2m_0^2 \cos \beta\varphi \,.$$

We use the parameters ν, μ:

$$\beta^2 = 1 - \nu \quad (\frac{1}{2} < \nu < 1)\,, \quad m_0^2 = \frac{\mu^2}{\sin \pi\nu}$$

$$M_{\rm soliton} = 4C\mu^{1/\nu}\,, \quad C = \frac{\Gamma\left(\frac{1-\nu}{2\nu}\right)}{2\pi\Gamma\left(\frac{1}{2\nu}\right)}\Gamma(\nu)^{1/\nu}$$

Introduction

We consider the sine-Gordon model

$$\mathcal{L}_{\mathrm{sG}} = \frac{1}{16\pi}(\partial_\mu \varphi)^2 - 2m_0^2 \cos \beta\varphi \,.$$

We use the parameters ν, μ:

$$\beta^2 = 1 - \nu \quad (\frac{1}{2} < \nu < 1)\,, \quad m_0^2 = \frac{\mu^2}{\sin \pi\nu}$$

$$M_{\mathrm{soliton}} = 4C\mu^{1/\nu}\,, \quad C = \frac{\Gamma\left(\frac{1-\nu}{2\nu}\right)}{2\pi\Gamma\left(\frac{1}{2\nu}\right)}\Gamma(\nu)^{1/\nu}$$

Introduction

We consider the sine-Gordon model

$$\mathcal{L}_{\rm sG} = \frac{1}{16\pi}(\partial_\mu \varphi)^2 - 2m_0^2 \cos\beta\varphi \,.$$

We use the parameters ν, μ:

$$\beta^2 = 1 - \nu \quad (\frac{1}{2} < \nu < 1)\,, \quad m_0^2 = \frac{\mu^2}{\sin \pi\nu}$$

$$M_{\rm soliton} = 4C\mu^{1/\nu}, \quad C = \frac{\Gamma\left(\frac{1-\nu}{2\nu}\right)}{2\pi\Gamma\left(\frac{1}{2\nu}\right)}\Gamma(\nu)^{1/\nu}$$

ntroduction

We consider the sine-Gordon model

$$\mathcal{L}_{\mathrm{sG}} = \frac{1}{16\pi}(\partial_\mu \varphi)^2 - 2m_0^2 \cos \beta\varphi \,.$$

We use the parameters ν, μ:

$$\beta^2 = 1 - \nu \quad (\frac{1}{2} < \nu < 1)\,, \quad m_0^2 = \frac{\mu^2}{\sin \pi\nu}$$

$$M_{\mathrm{soliton}} = 4C\mu^{1/\nu}, \quad C = \frac{\Gamma\left(\frac{1-\nu}{2\nu}\right)}{2\pi\Gamma\left(\frac{1}{2\nu}\right)}\Gamma(\nu)^{1/\nu}$$

ntroduction

We consider the sine-Gordon model

$$\mathcal{L}_{sG} = \frac{1}{16\pi}(\partial_\mu \varphi)^2 - 2m_0^2 \cos \beta\varphi \, .$$

We use the parameters ν, μ:

$$\beta^2 = 1 - \nu \quad (\frac{1}{2} < \nu < 1) \, , \quad m_0^2 = \frac{\mu^2}{\sin \pi\nu}$$

$$M_{\text{soliton}} = 4C\mu^{1/\nu} \, , \quad C = \frac{\Gamma\left(\frac{1-\nu}{2\nu}\right)}{2\pi\Gamma\left(\frac{1}{2\nu}\right)}\Gamma(\nu)^{1/\nu}$$

Introduction

We consider the sine-Gordon model

$$\mathcal{L}_{\rm sG} = \frac{1}{16\pi}(\partial_\mu \varphi)^2 - 2m_0^2 \cos \beta\varphi \,.$$

We use the parameters ν, μ:

$$\beta^2 = 1 - \nu \quad (\frac{1}{2} < \nu < 1)\,, \quad m_0^2 = \frac{\mu^2}{\sin \pi\nu}$$

$$M_{\rm soliton} = 4C\mu^{1/\nu}, \quad C = \frac{\Gamma\left(\frac{1-\nu}{2\nu}\right)}{2\pi\Gamma\left(\frac{1}{2\nu}\right)}\Gamma(\nu)^{1/\nu}$$

Introduction

We consider the sine-Gordon model

$$\mathcal{L}_{sG} = \frac{1}{16\pi}(\partial_\mu \varphi)^2 - 2m_0^2 \cos \beta\varphi\,.$$

We use the parameters ν, μ:

$$\beta^2 = 1 - \nu \quad (\frac{1}{2} < \nu < 1)\,, \quad m_0^2 = \frac{\mu^2}{\sin \pi\nu}$$

$$M_{\mathrm{soliton}} = 4C\mu^{1/\nu}\,, \quad C = \frac{\Gamma\left(\frac{1-\nu}{2\nu}\right)}{2\pi\Gamma\left(\frac{1}{2\nu}\right)}\Gamma(\nu)^{1/\nu}$$

Introduction

We consider the sine-Gordon model

$$\mathcal{L}_{sG} = \frac{1}{16\pi}(\partial_\mu \varphi)^2 - 2m_0^2 \cos \beta\varphi \,.$$

We use the parameters ν, μ:

$$\beta^2 = 1 - \nu \quad (\frac{1}{2} < \nu < 1)\,, \quad m_0^2 = \frac{\mu^2}{\sin \pi\nu}$$

$$M_{\text{soliton}} = 4C\mu^{1/\nu}, \quad C = \frac{\Gamma\left(\frac{1-\nu}{2\nu}\right)}{2\pi\Gamma\left(\frac{1}{2\nu}\right)}\Gamma(\nu)^{1/\nu}$$

Our concern in this talk is a systematic study of

- the space of all local fields,
- their VEVs and form factors.

Introduction

We consider the sine-Gordon model

$$\mathcal{L}_{sG} = \frac{1}{16\pi}(\partial_\mu \varphi)^2 - 2m_0^2 \cos \beta\varphi \,.$$

We use the parameters ν, μ:

$$\beta^2 = 1 - \nu \quad (\frac{1}{2} < \nu < 1)\,, \quad m_0^2 = \frac{\mu^2}{\sin \pi\nu}$$

$$M_{\text{soliton}} = 4C\mu^{1/\nu}\,, \quad C = \frac{\Gamma\left(\frac{1-\nu}{2\nu}\right)}{2\pi\Gamma\left(\frac{1}{2\nu}\right)}\Gamma(\nu)^{1/\nu}$$

Our concern in this talk is a systematic study of

- the space of all local fields,
- their VEVs and form factors.

ntroduction

We consider the sine-Gordon model

$$\mathcal{L}_{sG} = \frac{1}{16\pi}(\partial_\mu \varphi)^2 - 2m_0^2 \cos \beta\varphi \,.$$

We use the parameters ν, μ:

$$\beta^2 = 1 - \nu \quad (\frac{1}{2} < \nu < 1)\,, \quad m_0^2 = \frac{\mu^2}{\sin \pi\nu}$$

$$M_{\mathrm{soliton}} = 4C\mu^{1/\nu}\,, \quad C = \frac{\Gamma\left(\frac{1-\nu}{2\nu}\right)}{2\pi\Gamma\left(\frac{1}{2\nu}\right)}\Gamma(\nu)^{1/\nu}$$

Our concern in this talk is a systematic study of

- the space of all local fields,
- their VEVs and form factors.

Introduction

We consider the sine-Gordon model

$$\mathcal{L}_{sG} = \frac{1}{16\pi}(\partial_\mu \varphi)^2 - 2m_0^2 \cos \beta\varphi \,.$$

We use the parameters ν, μ:

$$\beta^2 = 1 - \nu \quad (\frac{1}{2} < \nu < 1)\,, \quad m_0^2 = \frac{\mu^2}{\sin \pi\nu}$$

$$M_{\text{soliton}} = 4C\mu^{1/\nu}\,, \quad C = \frac{\Gamma\left(\frac{1-\nu}{2\nu}\right)}{2\pi\Gamma\left(\frac{1}{2\nu}\right)}\Gamma(\nu)^{1/\nu}$$

Our concern in this talk is a systematic study of

- the space of all local fields,
- their VEVs and form factors.

Introduction

We consider the sine-Gordon model

$$\mathcal{L}_{\mathrm{sG}} = \frac{1}{16\pi}(\partial_\mu\varphi)^2 - 2m_0^2 \cos\beta\varphi\,.$$

We use the parameters ν, μ:

$$\beta^2 = 1-\nu \quad (\frac{1}{2} < \nu < 1)\,, \quad m_0^2 = \frac{\mu^2}{\sin\pi\nu}$$

$$M_{\mathrm{soliton}} = 4C\mu^{1/\nu}\,, \quad C = \frac{\Gamma\left(\frac{1-\nu}{2\nu}\right)}{2\pi\Gamma\left(\frac{1}{2\nu}\right)}\Gamma(\nu)^{1/\nu}$$

Our concern in this talk is a systematic study of

- the space of all local fields,
- their VEVs and form factors.

ntroduction

We consider the sine-Gordon model

$$\mathcal{L}_{\mathrm{sG}} = \frac{1}{16\pi}(\partial_\mu \varphi)^2 - 2m_0^2 \cos \beta\varphi \, .$$

We use the parameters ν, μ:

$$\beta^2 = 1 - \nu \quad (\frac{1}{2} < \nu < 1), \quad m_0^2 = \frac{\mu^2}{\sin \pi\nu}$$

$$M_{\mathrm{soliton}} = 4C\mu^{1/\nu}, \quad C = \frac{\Gamma\left(\frac{1-\nu}{2\nu}\right)}{2\pi\Gamma\left(\frac{1}{2\nu}\right)}\Gamma(\nu)^{1/\nu}$$

Our concern in this talk is a systematic study of

- the space of all local fields,
- their VEVs and form factors.

Introduction

We consider the sine-Gordon model

$$\mathcal{L}_{\mathrm{sG}} = \frac{1}{16\pi}(\partial_\mu \varphi)^2 - 2m_0^2 \cos \beta\varphi \,.$$

We use the parameters ν, μ:

$$\beta^2 = 1 - \nu \quad (\frac{1}{2} < \nu < 1)\,, \quad m_0^2 = \frac{\mu^2}{\sin \pi\nu}$$

$$M_{\mathrm{soliton}} = 4C\mu^{1/\nu}\,, \quad C = \frac{\Gamma\left(\frac{1-\nu}{2\nu}\right)}{2\pi\Gamma\left(\frac{1}{2\nu}\right)}\Gamma(\nu)^{1/\nu}$$

Our concern in this talk is a systematic study of

- the space of all local fields,
- their VEVs and form factors.

ntroduction

We consider the sine-Gordon model

$$\mathcal{L}_{sG} = \frac{1}{16\pi}(\partial_\mu\varphi)^2 - 2m_0^2\cos\beta\varphi\,.$$

We use the parameters ν, μ:

$$\beta^2 = 1-\nu \quad (\frac{1}{2}<\nu<1)\,, \quad m_0^2 = \frac{\mu^2}{\sin\pi\nu}$$

$$M_{\text{soliton}} = 4C\mu^{1/\nu}\,, \quad C = \frac{\Gamma\left(\frac{1-\nu}{2\nu}\right)}{2\pi\Gamma\left(\frac{1}{2\nu}\right)}\Gamma(\nu)^{1/\nu}$$

Our concern in this talk is a systematic study of

- the space of all local fields,
- their VEVs and form factors.

ntroduction

We consider the sine-Gordon model

$$\mathcal{L}_{\mathrm{sG}} = \frac{1}{16\pi}(\partial_\mu \varphi)^2 - 2m_0^2 \cos\beta\varphi \,.$$

We use the parameters ν, μ:

$$\beta^2 = 1 - \nu \quad (\frac{1}{2} < \nu < 1)\,, \quad m_0^2 = \frac{\mu^2}{\sin \pi\nu}$$

$$M_{\mathrm{soliton}} = 4C\mu^{1/\nu}, \quad C = \frac{\Gamma\left(\frac{1-\nu}{2\nu}\right)}{2\pi\Gamma\left(\frac{1}{2\nu}\right)}\Gamma(\nu)^{1/\nu}$$

Our concern in this talk is a systematic study of

- the space of all local fields,
- their VEVs and form factors.

ntroduction

We consider the sine-Gordon model

$$\mathcal{L}_{\rm sG} = \frac{1}{16\pi}(\partial_\mu \varphi)^2 - 2m_0^2 \cos \beta\varphi \, .$$

We use the parameters ν, μ:

$$\beta^2 = 1 - \nu \quad (\frac{1}{2} < \nu < 1) , \quad m_0^2 = \frac{\mu^2}{\sin \pi\nu}$$

$$M_{\rm soliton} = 4C\mu^{1/\nu} , \quad C = \frac{\Gamma\left(\frac{1-\nu}{2\nu}\right)}{2\pi\Gamma\left(\frac{1}{2\nu}\right)}\Gamma(\nu)^{1/\nu}$$

Our concern in this talk is a systematic study of

- the space of all local fields,
- their VEVs and form factors.

Introduction

We consider the sine-Gordon model

$$\mathcal{L}_{sG} = \frac{1}{16\pi}(\partial_\mu \varphi)^2 - 2m_0^2 \cos \beta\varphi \,.$$

We use the parameters ν, μ:

$$\beta^2 = 1 - \nu \quad (\frac{1}{2} < \nu < 1)\,, \quad m_0^2 = \frac{\mu^2}{\sin \pi\nu}$$

$$M_{\rm soliton} = 4C\mu^{1/\nu}\,, \quad C = \frac{\Gamma\left(\frac{1-\nu}{2\nu}\right)}{2\pi\Gamma\left(\frac{1}{2\nu}\right)}\Gamma(\nu)^{1/\nu}$$

Our concern in this talk is a systematic study of

- the space of all local fields,
- their VEVs and form factors.

The 'space of local fields' has a clear meaning in the case

$$\mathcal{L}_{CFT} = \frac{1}{16\pi}(\partial_\mu \varphi)^2 - m_0^2 \, e^{i\beta\varphi} \, ,$$

which is conformally invariant, with $c = 1 - 6\nu^2/(1-\nu)$.

Introduction

We consider the sine-Gordon model

$$\mathcal{L}_{sG} = \frac{1}{16\pi}(\partial_\mu\varphi)^2 - 2m_0^2 \cos\beta\varphi\,.$$

We use the parameters ν, μ:

$$\beta^2 = 1-\nu \quad (\frac{1}{2} < \nu < 1)\,, \quad m_0^2 = \frac{\mu^2}{\sin\pi\nu}$$

$$M_{\text{soliton}} = 4C\mu^{1/\nu}\,, \quad C = \frac{\Gamma\left(\frac{1-\nu}{2\nu}\right)}{2\pi\Gamma\left(\frac{1}{2\nu}\right)}\Gamma(\nu)^{1/\nu}$$

Our concern in this talk is a systematic study of

- the space of all local fields,
- their VEVs and form factors.

Introduction

We consider the sine-Gordon model

$$\mathcal{L}_{sG} = \frac{1}{16\pi}(\partial_\mu\varphi)^2 - 2m_0^2 \cos\beta\varphi \,.$$

We use the parameters ν, μ:

$$\beta^2 = 1 - \nu \quad (\frac{1}{2} < \nu < 1) \,, \quad m_0^2 = \frac{\mu^2}{\sin \pi\nu}$$

$$M_{\text{soliton}} = 4C\mu^{1/\nu} \,, \quad C = \frac{\Gamma\left(\frac{1-\nu}{2\nu}\right)}{2\pi\Gamma\left(\frac{1}{2\nu}\right)}\Gamma(\nu)^{1/\nu}$$

Our concern in this talk is a systematic study of

- the space of all local fields,
- their VEVs and form factors.

Introduction

We consider the sine-Gordon model

$$\mathcal{L}_{sG} = \frac{1}{16\pi}(\partial_\mu \varphi)^2 - 2m_0^2 \cos \beta\varphi \,.$$

We use the parameters ν, μ:

$$\beta^2 = 1 - \nu \quad (\frac{1}{2} < \nu < 1)\,, \quad m_0^2 = \frac{\mu^2}{\sin \pi\nu}$$

$$M_{\mathrm{soliton}} = 4C\mu^{1/\nu}\,, \quad C = \frac{\Gamma\left(\frac{1-\nu}{2\nu}\right)}{2\pi\Gamma\left(\frac{1}{2\nu}\right)}\Gamma(\nu)^{1/\nu}$$

Our concern in this talk is a systematic study of

- the space of all local fields,
- their VEVs and form factors.

The 'space of local fields' has a clear meaning in the case

$$\mathcal{L}_{CFT} = \frac{1}{16\pi}(\partial_\mu \varphi)^2 - m_0^2\, e^{i\beta\varphi}\,.$$

which is conformally invariant, with $c = 1 - 6\nu^2/(1-\nu)$.

The 'space of local fields' has a clear meaning in the case

$$\mathcal{L}_{CFT} = \frac{1}{16\pi}(\partial_\mu \varphi)^2 - m_0^2\, e^{i\beta\varphi}\,,$$

which is conformally invariant, with $c = 1 - 6\nu^2/(1-\nu)$.

The 'space of local fields' has a clear meaning in the case

$$\mathcal{L}_{CFT} = \frac{1}{16\pi}(\partial_\mu \varphi)^2 - m_0^2 \, e^{i\beta\varphi} \,,$$

which is conformally invariant, with $c = 1 - 6\nu^2/(1-\nu)$.
The primary fields are the exponential fields

$$\Phi_\alpha = e^{\frac{\nu\alpha}{2\sqrt{1-\nu}} i\varphi} \,.$$

The 'space of local fields' has a clear meaning in the case

$$\mathcal{L}_{CFT} = \frac{1}{16\pi}(\partial_\mu \varphi)^2 - m_0^2 \, e^{i\beta\varphi} \, .$$

which is conformally invariant, with $c = 1 - 6\nu^2/(1-\nu)$.
The primary fields are the exponential fields

$$\Phi_\alpha = e^{\frac{\nu\alpha}{2\sqrt{1-\nu}} i\varphi} \, .$$

The 'space of local fields' has a clear meaning in the case

$$\mathcal{L}_{CFT} = \frac{1}{16\pi}(\partial_\mu\varphi)^2 - m_0^2\, e^{i\beta\varphi}\,.$$

which is conformally invariant, with $c = 1 - 6\nu^2/(1-\nu)$.
The primary fields are the exponential fields

$$\Phi_\alpha = e^{\frac{\nu\alpha}{2\sqrt{1-\nu}}i\varphi}\,.$$

The 'space of local fields' has a clear meaning in the case

$$\mathcal{L}_{CFT} = \frac{1}{16\pi}(\partial_\mu \varphi)^2 - m_0^2\, e^{i\beta\varphi}\,.$$

which is conformally invariant, with $c = 1 - 6\nu^2/(1-\nu)$.
The primary fields are the exponential fields

$$\Phi_{\alpha} = e^{\frac{\nu\alpha}{2\sqrt{1-\nu}} i\varphi}\,.$$

The 'space of local fields' has a clear meaning in the case

$$\mathcal{L}_{CFT} = \frac{1}{16\pi}(\partial_\mu \varphi)^2 - m_0^2 \, e^{i\beta\varphi} \, ,$$

which is conformally invariant, with $c = 1 - 6\nu^2/(1-\nu)$.
The primary fields are the exponential fields

$$\Phi_\alpha = e^{\frac{\nu\alpha}{2\sqrt{1-\nu}} i\varphi} \, .$$

The 'space of local fields' has a clear meaning in the case

$$\mathcal{L}_{CFT} = \frac{1}{16\pi}(\partial_\mu \varphi)^2 - m_0^2\, e^{i\beta\varphi}\,,$$

which is conformally invariant, with $c = 1 - 6\nu^2/(1-\nu)$.
The primary fields are the exponential fields

$$\Phi_\alpha = e^{\frac{\nu\alpha}{2\sqrt{1-\nu}} i\varphi}\,.$$

The 'space of local fields' has a clear meaning in the case

$$\mathcal{L}_{CFT} = \frac{1}{16\pi}(\partial_\mu \varphi)^2 - m_0^2 \, e^{i\beta\varphi} \, .$$

which is conformally invariant, with $c = 1 - 6\nu^2/(1-\nu)$.
The primary fields are the exponential fields

$$\Phi_\alpha = e^{\frac{\nu\alpha}{2\sqrt{1-\nu}} i\varphi} \, .$$

The 'space of local fields' has a clear meaning in the case

$$\mathcal{L}_{CFT} = \frac{1}{16\pi}(\partial_\mu \varphi)^2 - m_0^2\, e^{i\beta\varphi}\,,$$

which is conformally invariant, with $c = 1 - 6\nu^2/(1-\nu)$.
The primary fields are the exponential fields

$$\Phi_\alpha = e^{\frac{\nu\alpha}{2\sqrt{1-\nu}} i\varphi}\,.$$

The 'space of local fields' has a clear meaning in the case

$$\mathcal{L}_{CFT} = \frac{1}{16\pi}(\partial_\mu\varphi)^2 - m_0^2\, e^{i\beta\varphi}\,.$$

which is conformally invariant, with $c = 1 - 6\nu^2/(1-\nu)$.
The primary fields are the exponential fields

$$\Phi_\alpha = e^{\frac{\nu\alpha}{2\sqrt{1-\nu}}i\varphi}\,.$$

The 'space of local fields' has a clear meaning in the case

$$\mathcal{L}_{CFT} = \frac{1}{16\pi}(\partial_\mu\varphi)^2 - m_0^2\, e^{i\beta\varphi}\,.$$

which is conformally invariant, with $c = 1 - 6\nu^2/(1-\nu)$.
The primary fields are the exponential fields

$$\Phi_\alpha = e^{\frac{\nu\alpha}{2\sqrt{1-\nu}}i\varphi}\,.$$

The 'space of local fields' has a clear meaning in the case

$$\mathcal{L}_{CFT} = \frac{1}{16\pi}(\partial_\mu \varphi)^2 - m_0^2\, e^{i\beta\varphi}\,.$$

which is conformally invariant, with $c = 1 - 6\nu^2/(1-\nu)$.
The primary fields are the exponential fields

$$\Phi_\alpha = e^{\frac{\nu\alpha}{2\sqrt{1-\nu}} i\varphi}\,.$$

The 'space of local fields' has a clear meaning in the case

$$\mathcal{L}_{CFT} = \frac{1}{16\pi}(\partial_\mu \varphi)^2 - m_0^2 \, e^{i\beta\varphi} \, .$$

which is conformally invariant, with $c = 1 - 6\nu^2/(1-\nu)$.
The primary fields are the exponential fields

$$\Phi_\alpha = e^{\frac{\nu\alpha}{2\sqrt{1-\nu}} i\varphi} \, .$$

The 'space of local fields' has a clear meaning in the case

$$\mathcal{L}_{CFT} = \frac{1}{16\pi}(\partial_\mu \varphi)^2 - m_0^2 \, e^{i\beta\varphi} \, ,$$

which is conformally invariant, with $c = 1 - 6\nu^2/(1-\nu)$.
The primary fields are the exponential fields

$$\Phi_\alpha = e^{\frac{\nu\alpha}{2\sqrt{1-\nu}} i\varphi} \, .$$

The 'space of local fields' has a clear meaning in the case

$$\mathcal{L}_{CFT} = \frac{1}{16\pi}(\partial_\mu \varphi)^2 - m_0^2\, e^{i\beta\varphi}\,.$$

which is conformally invariant, with $c = 1 - 6\nu^2/(1-\nu)$.
The primary fields are the exponential fields

$$\Phi_\alpha = e^{\frac{\nu\alpha}{2\sqrt{1-\nu}} i\varphi}\,.$$

The 'space of local fields' has a clear meaning in the case

$$\mathcal{L}_{CFT} = \frac{1}{16\pi}(\partial_\mu \varphi)^2 - m_0^2 \, e^{i\beta\varphi} \, .$$

which is conformally invariant, with $c = 1 - 6\nu^2/(1-\nu)$.
The primary fields are the exponential fields

$$\Phi_\alpha = e^{\frac{\nu\alpha}{2\sqrt{1-\nu}} i\varphi} \, .$$

The 'space of local fields' has a clear meaning in the case

$$\mathcal{L}_{CFT} = \frac{1}{16\pi}(\partial_\mu \varphi)^2 - m_0^2 \, e^{i\beta\varphi} \, .$$

which is conformally invariant, with $c = 1 - 6\nu^2/(1-\nu)$.
The primary fields are the exponential fields

$$\Phi_\alpha = e^{\frac{\nu\alpha}{2\sqrt{1-\nu}} i\varphi} \, .$$

The 'space of local fields' has a clear meaning in the case

$$\mathcal{L}_{CFT} = \frac{1}{16\pi}(\partial_\mu\varphi)^2 - m_0^2\, e^{i\beta\varphi}\,.$$

which is conformally invariant, with $c = 1 - 6\nu^2/(1-\nu)$.
The primary fields are the exponential fields

$$\Phi_\alpha = e^{\frac{\nu\alpha}{2\sqrt{1-\nu}}i\varphi}\,.$$

The 'space of local fields' has a clear meaning in the case

$$\mathcal{L}_{CFT} = \frac{1}{16\pi}(\partial_\mu\varphi)^2 - m_0^2\, e^{i\beta\varphi}\,,$$

which is conformally invariant, with $c = 1 - 6\nu^2/(1-\nu)$.
The primary fields are the exponential fields

$$\Phi_\alpha = e^{\frac{\nu\alpha}{2\sqrt{1-\nu}}i\varphi}\,.$$

The space of all descendants is spanned by

$$\ell_{-\mathbf{N}}\bar{\ell}_{-\overline{\mathbf{N}}}\Phi_\alpha\,,$$

where

$$\ell_{-\mathbf{N}} = \ell_{-N_1}\cdots\ell_{-N_l} \quad (\mathbf{N} = (N_1,\cdots,N_l))\,, etc.,$$

$$\ell_n\bar{\ell}_m\mathcal{O} = \frac{1}{(2\pi i)^2}\oint\oint dz d\bar{z}\, z^{n+1}\bar{z}^{m+1}\, T(z)\,\bar{T}(\bar{z})\mathcal{O}\,.$$

The 'space of local fields' has a clear meaning in the case

$$\mathcal{L}_{CFT} = \frac{1}{16\pi}(\partial_\mu\varphi)^2 - m_0^2\, e^{i\beta\varphi}\,,$$

which is conformally invariant, with $c = 1 - 6\nu^2/(1-\nu)$.
The primary fields are the exponential fields

$$\Phi_\alpha = e^{\frac{\nu\alpha}{2\sqrt{1-\nu}}i\varphi}\,.$$

The space of all descendants is spanned by

$$\ell_{-\mathbf{N}}\bar{\ell}_{-\overline{\mathbf{N}}}\Phi_\alpha\,,$$

where

$$\ell_{-\mathbf{N}} = \ell_{-N_1}\cdots\ell_{-N_l} \quad (\mathbf{N} = (N_1,\cdots,N_l))\,,\, etc.,$$

$$\ell_n\bar{\ell}_m\mathcal{O} = \frac{1}{(2\pi i)^2}\oint\oint dz d\bar{z}\, z^{n+1}\bar{z}^{m+1}\, T(z)\,\bar{T}(\bar{z})\mathcal{O}\,.$$

The 'space of local fields' has a clear meaning in the case

$$\mathcal{L}_{CFT} = \frac{1}{16\pi}(\partial_\mu \varphi)^2 - m_0^2 \, e^{i\beta\varphi} \,,$$

which is conformally invariant, with $c = 1 - 6\nu^2/(1-\nu)$.
The primary fields are the exponential fields

$$\Phi_{\alpha} = e^{\frac{\nu\alpha}{2\sqrt{1-\nu}} i\varphi} \,.$$

The space of all descendants is spanned by

$$\ell_{-\mathbf{N}} \bar{\ell}_{-\overline{\mathbf{N}}} \Phi_{\alpha} \,,$$

where

$$\ell_{-\mathbf{N}} = \ell_{-N_1} \cdots \ell_{-N_l} \quad (\mathbf{N} = (N_1, \cdots, N_l)) \,, etc.,$$

$$\ell_n \bar{\ell}_m \mathcal{O} = \frac{1}{(2\pi i)^2} \oint\oint dz d\bar{z} \, z^{n+1} \bar{z}^{m+1} \, T(z) \, \bar{T}(\bar{z}) \mathcal{O} \,.$$

The 'space of local fields' has a clear meaning in the case

$$\mathcal{L}_{CFT} = \frac{1}{16\pi}(\partial_\mu\varphi)^2 - m_0^2\, e^{i\beta\varphi}\,.$$

which is conformally invariant, with $c = 1 - 6\nu^2/(1-\nu)$.
The primary fields are the exponential fields

$$\Phi_\alpha = e^{\frac{\nu\alpha}{2\sqrt{1-\nu}}i\varphi}\,.$$

The space of all descendants is spanned by

$$\ell_{-\mathbf{N}}\bar{\ell}_{-\overline{\mathbf{N}}}\Phi_\alpha\,,$$

where

$$\ell_{-\mathbf{N}} = \ell_{-N_1}\cdots\ell_{-N_l}\quad (\mathbf{N} = (N_1,\cdots,N_l))\,,\ etc.,$$
$$\ell_n\bar{\ell}_m\mathcal{O} = \frac{1}{(2\pi i)^2}\oint\oint dz d\bar{z}\, z^{n+1}\bar{z}^{m+1}\,T(z)\,\bar{T}(\bar{z})\mathcal{O}\,.$$

The 'space of local fields' has a clear meaning in the case

$$\mathcal{L}_{CFT} = \frac{1}{16\pi}(\partial_\mu\varphi)^2 - m_0^2\, e^{i\beta\varphi}\,,$$

which is conformally invariant, with $c = 1 - 6\nu^2/(1-\nu)$.
The primary fields are the exponential fields

$$\Phi_\alpha = e^{\frac{\nu\alpha}{2\sqrt{1-\nu}} i\varphi}\,.$$

The space of all descendants is spanned by

$$\ell_{-\mathbf{N}}\bar{\ell}_{-\overline{\mathbf{N}}}\Phi_\alpha\,,$$

where

$$\ell_{-\mathbf{N}} = \ell_{-N_1}\cdots\ell_{-N_l} \quad (\mathbf{N} = (N_1,\cdots,N_l))\,, etc.,$$

$$\ell_n\bar{\ell}_m\mathcal{O} = \frac{1}{(2\pi i)^2}\oint\oint dz d\bar{z}\, z^{n+1}\bar{z}^{m+1}\, T(z)\,\bar{T}(\bar{z})\mathcal{O}\,.$$

The 'space of local fields' has a clear meaning in the case

$$\mathcal{L}_{CFT} = \frac{1}{16\pi}(\partial_\mu\varphi)^2 - m_0^2\, e^{i\beta\varphi}\,.$$

which is conformally invariant, with $c = 1 - 6\nu^2/(1-\nu)$.
The primary fields are the exponential fields

$$\Phi_\alpha = e^{\frac{\nu\alpha}{2\sqrt{1-\nu}} i\varphi}\,.$$

The space of all descendants is spanned by

$$\ell_{-\mathbf{N}}\bar{\ell}_{-\overline{\mathbf{N}}}\Phi_\alpha\,,$$

where

$$\ell_{-\mathbf{N}} = \ell_{-N_1}\cdots\ell_{-N_l} \quad (\mathbf{N} = (N_1,\cdots,N_l))\,, etc.,$$

$$\ell_n\bar{\ell}_m\mathcal{O} = \frac{1}{(2\pi i)^2}\oint\oint dz d\bar{z}\, z^{n+1}\bar{z}^{m+1}\, T(z)\bar{T}(\bar{z})\mathcal{O}\,.$$

The 'space of local fields' has a clear meaning in the case

$$\mathcal{L}_{CFT} = \frac{1}{16\pi}(\partial_\mu \varphi)^2 - m_0^2\, e^{i\beta\varphi}\,.$$

which is conformally invariant, with $c = 1 - 6\nu^2/(1-\nu)$.
The primary fields are the exponential fields

$$\Phi_\alpha = e^{\frac{\nu\alpha}{2\sqrt{1-\nu}} i\varphi}\,.$$

The space of all descendants is spanned by

$$\ell_{-\mathbf{N}}\bar{\ell}_{-\overline{\mathbf{N}}}\Phi_\alpha\,,$$

where

$$\ell_{-\mathbf{N}} = \ell_{-N_1}\cdots\ell_{-N_l} \quad (\mathbf{N} = (N_1, \cdots, N_l))\,, etc.,$$

$$\ell_n\bar{\ell}_m\mathcal{O} = \frac{1}{(2\pi i)^2}\oint\oint dz d\bar{z}\, z^{n+1}\bar{z}^{m+1}\, T(z)\,\bar{T}(\bar{z})\mathcal{O}\,.$$

The 'space of local fields' has a clear meaning in the case

$$\mathcal{L}_{CFT} = \frac{1}{16\pi}(\partial_\mu\varphi)^2 - m_0^2\, e^{i\beta\varphi}\,,$$

which is conformally invariant, with $c = 1 - 6\nu^2/(1-\nu)$.
The primary fields are the exponential fields

$$\Phi_\alpha = e^{\frac{\nu\alpha}{2\sqrt{1-\nu}}i\varphi}\,.$$

The space of all descendants is spanned by

$$\ell_{-\mathbf{N}}\bar{\ell}_{-\overline{\mathbf{N}}}\Phi_\alpha\,,$$

where

$$\ell_{-\mathbf{N}} = \ell_{-N_1}\cdots\ell_{-N_l} \quad (\mathbf{N} = (N_1,\cdots,N_l))\,, etc.,$$

$$\ell_n\bar{\ell}_m\mathcal{O} = \frac{1}{(2\pi i)^2}\oint\oint dz d\bar{z}\, z^{n+1}\bar{z}^{m+1}\, T(z)\,\bar{T}(\bar{z})\mathcal{O}\,.$$

The 'space of local fields' has a clear meaning in the case

$$\mathcal{L}_{CFT} = \frac{1}{16\pi}(\partial_\mu \varphi)^2 - m_0^2\, e^{i\beta\varphi}\,,$$

which is conformally invariant, with $c = 1 - 6\nu^2/(1-\nu)$.
The primary fields are the exponential fields

$$\Phi_\alpha = e^{\frac{\nu\alpha}{2\sqrt{1-\nu}} i\varphi}\,.$$

The space of all descendants is spanned by

$$\ell_{-\mathbf{N}}\bar{\ell}_{-\overline{\mathbf{N}}}\Phi_\alpha\,,$$

where

$$\ell_{-\mathbf{N}} = \ell_{-N_1}\cdots\ell_{-N_l} \quad (\mathbf{N} = (N_1, \cdots, N_l))\,, etc.,$$

$$\ell_n\bar{\ell}_m\mathcal{O} = \frac{1}{(2\pi i)^2}\oint\oint dz d\bar{z}\, z^{n+1}\bar{z}^{m+1}\, T(z)\,\bar{T}(\bar{z})\mathcal{O}\,.$$

The 'space of local fields' has a clear meaning in the case

$$\mathcal{L}_{CFT} = \frac{1}{16\pi}(\partial_\mu\varphi)^2 - m_0^2\, e^{i\beta\varphi}\,,$$

which is conformally invariant, with $c = 1 - 6\nu^2/(1-\nu)$. The primary fields are the exponential fields

$$\Phi_\alpha = e^{\frac{\nu\alpha}{2\sqrt{1-\nu}}i\varphi}\,.$$

The space of all descendants is spanned by

$$\ell_{-\mathbf{N}}\bar{\ell}_{-\overline{\mathbf{N}}}\Phi_\alpha\,,$$

where

$$\ell_{-\mathbf{N}} = \ell_{-N_1}\cdots\ell_{-N_l} \quad (\mathbf{N} = (N_1,\cdots,N_l))\,,\ etc.,$$

$$\ell_n\bar{\ell}_m\mathcal{O} = \frac{1}{(2\pi i)^2}\oint\oint dz d\bar{z}\, z^{n+1}\bar{z}^{m+1}\, T(z)\,\bar{T}(\bar{z})\mathcal{O}\,.$$

The 'space of local fields' has a clear meaning in the case

$$\mathcal{L}_{CFT} = \frac{1}{16\pi}(\partial_\mu \varphi)^2 - m_0^2\, e^{i\beta\varphi}\,.$$

which is conformally invariant, with $c = 1 - 6\nu^2/(1-\nu)$.
The primary fields are the exponential fields

$$\Phi_\alpha = e^{\frac{\nu\alpha}{2\sqrt{1-\nu}} i\varphi}\,.$$

The space of all descendants is spanned by

$$\ell_{-\mathbf{N}}\bar{\ell}_{-\overline{\mathbf{N}}}\Phi_\alpha\,,$$

where

$$\ell_{-\mathbf{N}} = \ell_{-N_1}\cdots\ell_{-N_l} \quad (\mathbf{N} = (N_1,\cdots,N_l))\,, etc.,$$

$$\ell_n\bar{\ell}_m\mathcal{O} = \frac{1}{(2\pi i)^2}\oint\oint dz d\bar{z}\, z^{n+1}\bar{z}^{m+1}\, T(z)\,\bar{T}(\bar{z})\mathcal{O}\,.$$

The 'space of local fields' has a clear meaning in the case

$$\mathcal{L}_{CFT} = \frac{1}{16\pi}(\partial_\mu \varphi)^2 - m_0^2\, e^{i\beta\varphi}\,,$$

which is conformally invariant, with $c = 1 - 6\nu^2/(1-\nu)$.
The primary fields are the exponential fields

$$\Phi_\alpha = e^{\frac{\nu\alpha}{2\sqrt{1-\nu}} i\varphi}\,.$$

The space of all descendants is spanned by

$$\ell_{-\mathbf{N}}\bar{\ell}_{-\overline{\mathbf{N}}}\Phi_\alpha\,,$$

where

$$\ell_{-\mathbf{N}} = \ell_{-N_1}\cdots\ell_{-N_l} \quad (\mathbf{N} = (N_1,\cdots,N_l))\,, etc.,$$
$$\ell_n\bar{\ell}_m\mathcal{O} = \frac{1}{(2\pi i)^2}\oint\oint dz d\bar{z}\, z^{n+1}\bar{z}^{m+1}\, T(z)\,\bar{T}(\bar{z})\mathcal{O}\,.$$

The 'space of local fields' has a clear meaning in the case

$$\mathcal{L}_{CFT} = \frac{1}{16\pi}(\partial_\mu\varphi)^2 - m_0^2\, e^{i\beta\varphi}\,,$$

which is conformally invariant, with $c = 1 - 6\nu^2/(1-\nu)$.
The primary fields are the exponential fields

$$\Phi_\alpha = e^{\frac{\nu\alpha}{2\sqrt{1-\nu}}i\varphi}\,.$$

The space of all descendants is spanned by

$$\ell_{-\mathbf{N}}\bar{\ell}_{-\overline{\mathbf{N}}}\Phi_\alpha\,,$$

where

$$\ell_{-\mathbf{N}} = \ell_{-N_1}\cdots\ell_{-N_l} \quad (\mathbf{N} = (N_1,\cdots,N_l))\,, etc.,$$

$$\ell_n\bar{\ell}_m\mathcal{O} = \frac{1}{(2\pi i)^2}\oint\oint dzd\bar{z}\, z^{n+1}\bar{z}^{m+1}\,T(z)\,\bar{T}(\bar{z})\mathcal{O}\,.$$

The 'space of local fields' has a clear meaning in the case

$$\mathcal{L}_{CFT} = \frac{1}{16\pi}(\partial_\mu\varphi)^2 - m_0^2\, e^{i\beta\varphi}\,,$$

which is conformally invariant, with $c = 1 - 6\nu^2/(1-\nu)$.
The primary fields are the exponential fields

$$\Phi_\alpha = e^{\frac{\nu\alpha}{2\sqrt{1-\nu}}i\varphi}\,.$$

The space of all descendants is spanned by

$$\ell_{-\mathbf{N}}\bar{\ell}_{-\overline{\mathbf{N}}}\Phi_\alpha\,,$$

where

$$\ell_{-\mathbf{N}} = \ell_{-N_1}\cdots\ell_{-N_l} \quad (\mathbf{N} = (N_1,\cdots,N_l))\,,\, etc.,$$
$$\ell_n\bar{\ell}_m\mathcal{O} = \frac{1}{(2\pi i)^2}\oint\oint dz d\bar{z}\, z^{n+1}\bar{z}^{m+1}\,T(z)\,\bar{T}(\bar{z})\mathcal{O}\,.$$

The 'space of local fields' has a clear meaning in the case

$$\mathcal{L}_{CFT} = \frac{1}{16\pi}(\partial_\mu\varphi)^2 - m_0^2\, e^{i\beta\varphi}\,,$$

which is conformally invariant, with $c = 1 - 6\nu^2/(1-\nu)$.
The primary fields are the exponential fields

$$\Phi_\alpha = e^{\frac{\nu\alpha}{2\sqrt{1-\nu}}i\varphi}\,.$$

The space of all descendants is spanned by

$$\ell_{-\mathbf{N}}\bar{\ell}_{-\overline{\mathbf{N}}}\Phi_\alpha\,,$$

where

$$\ell_{-\mathbf{N}} = \ell_{-N_1}\cdots\ell_{-N_l} \quad (\mathbf{N} = (N_1,\cdots,N_l))\,,\, etc.,$$

$$\ell_n\bar{\ell}_m\mathcal{O} = \frac{1}{(2\pi i)^2}\oint\oint dz d\bar{z}\, z^{n+1}\bar{z}^{m+1}\, T(z)\,\bar{T}(\bar{z})\mathcal{O}\,.$$

The 'space of local fields' has a clear meaning in the case

$$\mathcal{L}_{CFT} = \frac{1}{16\pi}(\partial_\mu\varphi)^2 - m_0^2\, e^{i\beta\varphi}\,,$$

which is conformally invariant, with $c = 1 - 6\nu^2/(1-\nu)$.
The primary fields are the exponential fields

$$\Phi_\alpha = e^{\,\frac{\nu\alpha}{2\sqrt{1-\nu}}i\varphi}\,.$$

The space of all descendants is spanned by

$$\ell_{-\mathbf{N}}\bar{\ell}_{-\overline{\mathbf{N}}}\Phi_\alpha\,,$$

where

$$\ell_{-\mathbf{N}} = \ell_{-N_1}\cdots\ell_{-N_l} \quad (\mathbf{N} = (N_1,\cdots,N_l))\,, etc.,$$

$$\ell_n\bar{\ell}_m\mathcal{O} = \frac{1}{(2\pi i)^2}\oint\oint dz d\bar{z}\, z^{n+1}\bar{z}^{m+1}\, T(z)\,\bar{T}(\bar{z})\mathcal{O}\,.$$

In the massive case, action of the Virasoro algebra is lost.

In the massive case, action of the Virasoro algebra is lost. Nevertheless, for generic ν and α,

$$\ell_{-\mathbf{N}}\bar{\ell}_{-\bar{\mathbf{N}}}\Phi_\alpha(0)$$

remains good as a label for the corresponding renormalized field. (Al.Zamolodchikov, 1991)

In the massive case, action of the Virasoro algebra is lost.
Nevertheless, for generic ν and α,

$$\ell_{-\mathbf{N}}\bar{\ell}_{-\bar{\mathbf{N}}}\Phi_\alpha(0)$$

remains good as a label for the corresponding renormalized field.
(Al.Zamolodchikov, 1991)

In the massive case, action of the Virasoro algebra is lost. Nevertheless, for generic ν and α,

$$\ell_{-\mathbf{N}}\bar{\ell}_{-\bar{\mathbf{N}}}\Phi_\alpha(0)$$

remains good as a label for the corresponding renormalized field. (Al.Zamolodchikov, 1991)

In the massive case, action of the Virasoro algebra is lost.
Nevertheless, for generic ν and α,

$$\ell_{-\mathbf{N}}\bar{\ell}_{-\bar{\mathbf{N}}}\Phi_\alpha(0)$$

remains good as a label for the corresponding renormalized field.
(Al.Zamolodchikov, 1991)

In the massive case, action of the Virasoro algebra is lost. Nevertheless, for generic ν and α,

$$\ell_{-\mathbf{N}}\bar{\ell}_{-\bar{\mathbf{N}}}\Phi_{\alpha}(0)$$

remains good as a label for the corresponding renormalized field. (Al.Zamolodchikov, 1991)

In the massive case, action of the Virasoro algebra is lost.
Nevertheless, for generic ν and α,

$$\ell_{-\mathbf{N}}\bar{\ell}_{-\bar{\mathbf{N}}}\Phi_{\alpha}(0)$$

remains good as a label for the corresponding renormalized field.
(Al.Zamolodchikov, 1991)

In the massive case, action of the Virasoro algebra is lost. Nevertheless, for generic ν and α,

$$\ell_{-\mathbf{N}}\bar{\ell}_{-\bar{\mathbf{N}}}\Phi_\alpha(0)$$

remains good as a label for the corresponding renormalized field. (Al.Zamolodchikov, 1991)

In the massive case, action of the Virasoro algebra is lost. Nevertheless, for generic ν and α,

$$\ell_{-\mathbf{N}}\bar{\ell}_{-\bar{\mathbf{N}}}\Phi_\alpha(0)$$

remains good as a label for the corresponding renormalized field. (Al.Zamolodchikov, 1991)

In the massive case, action of the Virasoro algebra is lost. Nevertheless, for generic ν and α,

$$\ell_{-\mathbf{N}}\bar{\ell}_{-\bar{\mathbf{N}}}\Phi_{\alpha}(0)$$

remains good as a label for the corresponding renormalized field. (Al.Zamolodchikov, 1991)

In the massive case, action of the Virasoro algebra is lost. Nevertheless, for generic ν and α,

$$\ell_{-\mathbf{N}}\bar{\ell}_{-\bar{\mathbf{N}}}\Phi_\alpha(0)$$

remains good as a label for the corresponding renormalized field. (Al.Zamolodchikov, 1991)

In the massive case, action of the Virasoro algebra is lost. Nevertheless, for generic ν and α,

$$\ell_{-\mathbf{N}}\bar{\ell}_{-\bar{\mathbf{N}}}\Phi_\alpha(0)$$

remains good as a label for the corresponding renormalized field. (Al.Zamolodchikov, 1991)

In the massive case, action of the Virasoro algebra is lost. Nevertheless, for generic ν and α,

$$\ell_{-\mathbf{N}}\bar{\ell}_{-\bar{\mathbf{N}}}\Phi_\alpha(0)$$

remains good as a label for the corresponding renormalized field. (Al.Zamolodchikov, 1991)

In the massive case, action of the Virasoro algebra is lost. Nevertheless, for generic ν and α,

$$\ell_{-\mathbf{N}}\bar{\ell}_{-\bar{\mathbf{N}}}\Phi_\alpha(0)$$

remains good as a label for the corresponding renormalized field. (Al.Zamolodchikov, 1991)

In the massive case, action of the Virasoro algebra is lost. Nevertheless, for generic ν and α,

$$\ell_{-\mathbf{N}}\bar{\ell}_{-\bar{\mathbf{N}}}\Phi_{\alpha}(0)$$

remains good as a label for the corresponding renormalized field. (Al.Zamolodchikov, 1991)

In the massive case, action of the Virasoro algebra is lost. Nevertheless, for generic ν and α,

$$\ell_{-\mathbf{N}}\bar{\ell}_{-\bar{\mathbf{N}}}\Phi_{\alpha}(0)$$

remains good as a label for the corresponding renormalized field. (Al.Zamolodchikov, 1991)

In the massive case, action of the Virasoro algebra is lost. Nevertheless, for generic ν and α,

$$\ell_{-\mathbf{N}}\bar{\ell}_{-\bar{\mathbf{N}}}\Phi_{\alpha}(0)$$

remains good as a label for the corresponding renormalized field. (Al.Zamolodchikov, 1991)

In the massive case, action of the Virasoro algebra is lost.
Nevertheless, for generic ν and α,

$$\ell_{-\mathbf{N}}\bar{\ell}_{-\bar{\mathbf{N}}}\Phi_{\alpha}(0)$$

remains good as a label for the corresponding renormalized field.
(Al.Zamolodchikov, 1991)

In the massive case, action of the Virasoro algebra is lost.
Nevertheless, for generic ν and α,

$$\ell_{-\mathbf{N}}\bar{\ell}_{-\bar{\mathbf{N}}}\Phi_{\alpha}(0)$$

remains good as a label for the corresponding renormalized field.
(Al.Zamolodchikov, 1991)

In the massive case, action of the Virasoro algebra is lost.
Nevertheless, for generic ν and α,

$$\ell_{-\mathbf{N}}\bar{\ell}_{-\bar{\mathbf{N}}}\Phi_{\alpha}(0)$$

remains good as a label for the corresponding renormalized field.
(Al.Zamolodchikov, 1991)

In the massive case, action of the Virasoro algebra is lost. Nevertheless, for generic ν and α,

$$\ell_{-\mathbf{N}}\bar{\ell}_{-\bar{\mathbf{N}}}\Phi_{\alpha}(0)$$

remains good as a label for the corresponding renormalized field. (Al.Zamolodchikov, 1991)

In the massive case, action of the Virasoro algebra is lost. Nevertheless, for generic ν and α,

$$\ell_{-\mathbf{N}}\bar{\ell}_{-\bar{\mathbf{N}}}\Phi_\alpha(0)$$

remains good as a label for the corresponding renormalized field. (Al.Zamolodchikov, 1991)

In the massive case, action of the Virasoro algebra is lost. Nevertheless, for generic ν and α,

$$\ell_{-\mathbf{N}}\bar{\ell}_{-\bar{\mathbf{N}}}\Phi_{\alpha}(0)$$

remains good as a label for the corresponding renormalized field. (Al.Zamolodchikov, 1991)

In the massive case, action of the Virasoro algebra is lost.
Nevertheless, for generic ν and α,

$$\ell_{-\mathbf{N}}\bar{\ell}_{-\bar{\mathbf{N}}}\Phi_{\alpha}(0)$$

remains good as a label for the corresponding renormalized field.
(Al.Zamolodchikov, 1991)

In the massive case, action of the Virasoro algebra is lost.
Nevertheless, for generic ν and α,

$$\ell_{-\mathbf{N}}\bar{\ell}_{-\bar{\mathbf{N}}}\Phi_\alpha(0)$$

remains good as a label for the corresponding renormalized field.
(Al.Zamolodchikov, 1991)

In the massive case, action of the Virasoro algebra is lost. Nevertheless, for generic ν and α,

$$\ell_{-\mathbf{N}}\bar{\ell}_{-\bar{\mathbf{N}}}\Phi_{\alpha}(0)$$

remains good as a label for the corresponding renormalized field. (Al.Zamolodchikov, 1991)

In the massive case, action of the Virasoro algebra is lost.
Nevertheless, for generic ν and α,

$$\ell_{-\mathbf{N}}\bar{\ell}_{-\bar{\mathbf{N}}}\Phi_{\alpha}(0)$$

remains good as a label for the corresponding renormalized field.
(Al.Zamolodchikov, 1991)

In the massive case, action of the Virasoro algebra is lost. Nevertheless, for generic ν and α,

$$\ell_{-\mathbf{N}}\bar{\ell}_{-\bar{\mathbf{N}}}\Phi_\alpha(0)$$

remains good as a label for the corresponding renormalized field. (Al.Zamolodchikov, 1991)

In the massive case, action of the Virasoro algebra is lost. Nevertheless, for generic ν and α,

$$\ell_{-\mathbf{N}}\bar{\ell}_{-\bar{\mathbf{N}}}\Phi_{\alpha}(0)$$

remains good as a label for the corresponding renormalized field. (Al.Zamolodchikov, 1991)

In the massive case, action of the Virasoro algebra is lost.
Nevertheless, for generic ν and α,

$$\ell_{-\mathbf{N}}\bar{\ell}_{-\bar{\mathbf{N}}}\Phi_\alpha(0)$$

remains good as a label for the corresponding renormalized field.
(Al.Zamolodchikov, 1991)

Hoewever this is not the best basis for various reasons.

In the massive case, action of the Virasoro algebra is lost.
Nevertheless, for generic ν and α,

$$\ell_{-\mathbf{N}}\bar{\ell}_{-\bar{\mathbf{N}}}\Phi_\alpha(0)$$

remains good as a label for the corresponding renormalized field.
(Al.Zamolodchikov, 1991)

Hoewever this is not the best basis for various reasons.

In the massive case, action of the Virasoro algebra is lost. Nevertheless, for generic ν and α,

$$\ell_{-\mathbf{N}}\bar{\ell}_{-\bar{\mathbf{N}}}\Phi_{\alpha}(0)$$

remains good as a label for the corresponding renormalized field. (Al.Zamolodchikov, 1991)

Hoewever this is not the best basis for various reasons.

In the massive case, action of the Virasoro algebra is lost. Nevertheless, for generic ν and α,

$$\ell_{-\mathbf{N}}\bar{\ell}_{-\bar{\mathbf{N}}}\Phi_\alpha(0)$$

remains good as a label for the corresponding renormalized field. (Al.Zamolodchikov, 1991)

Hoewever this is not the best basis for various reasons.

In the massive case, action of the Virasoro algebra is lost. Nevertheless, for generic ν and α,

$$\ell_{-\mathbf{N}}\bar{\ell}_{-\bar{\mathbf{N}}}\Phi_\alpha(0)$$

remains good as a label for the corresponding renormalized field. (Al.Zamolodchikov, 1991)

Hoewever this is not the best basis for various reasons.

In the massive case, action of the Virasoro algebra is lost. Nevertheless, for generic ν and α,

$$\ell_{-\mathbf{N}}\bar{\ell}_{-\bar{\mathbf{N}}}\Phi_{\alpha}(0)$$

remains good as a label for the corresponding renormalized field. (Al.Zamolodchikov, 1991)

Hoewever this is not the best basis for various reasons.

In the massive case, action of the Virasoro algebra is lost.
Nevertheless, for generic ν and α,

$$\ell_{-\mathbf{N}}\bar{\ell}_{-\bar{\mathbf{N}}}\Phi_{\alpha}(0)$$

remains good as a label for the corresponding renormalized field.
(Al.Zamolodchikov, 1991)

Hoewever this is not the best basis for various reasons.

In the massive case, action of the Virasoro algebra is lost.
Nevertheless, for generic ν and α,

$$\ell_{-\mathbf{N}}\bar{\ell}_{-\bar{\mathbf{N}}}\Phi_\alpha(0)$$

remains good as a label for the corresponding renormalized field.
(Al.Zamolodchikov, 1991)

Hoewever this is not the best basis for various reasons.

We propose an alternative, fermionic basis of the same space

We propose an alternative, fermionic basis of the same space

$$\mathbf{i}_K \bar{\mathbf{i}}_{\bar{K}} \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha$$

We propose an alternative, fermionic basis of the same space

$$\mathbf{i}_K \bar{\mathbf{i}}_{\bar{K}} \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha$$

We propose an alternative, fermionic basis of the same space

$$\mathbf{i}_K \bar{\mathbf{i}}_{\bar{K}} \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha$$

where $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$,

$\mathbf{i}_{2j-1}, \bar{\mathbf{i}}_{2j-1}$ are local integrals of motion.

$\beta^*_{2j-1}, \gamma^*_{2j-1}, \bar{\beta}^*_{2j-1}, \bar{\gamma}^*_{2j-1}$ are fermions.

We propose an alternative, fermionic basis of the same space

$$\mathbf{i}_K \bar{\mathbf{i}}_{\bar{K}} \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha$$

where $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$,

$\mathbf{i}_{2j-1}, \bar{\mathbf{i}}_{2j-1}$ are local integrals of motion ,

$\beta^*_{2j-1}, \gamma^*_{2j-1}, \bar{\beta}^*_{2j-1}, \bar{\gamma}^*_{2j-1}$ are fermions .

We propose an alternative, fermionic basis of the same space

$$\mathbf{i}_K \bar{\mathbf{i}}_{\bar{K}} \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha$$

where $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$,

$$\mathbf{i}_{2j-1},\ \bar{\mathbf{i}}_{2j-1} \quad \text{are local integrals of motion}\,,$$

$$\beta^*_{2j-1}, \gamma^*_{2j-1}, \bar{\beta}^*_{2j-1}, \bar{\gamma}^*_{2j-1} \quad \text{are fermions}\,.$$

We propose an alternative, fermionic basis of the same space

$$\mathbf{i}_K \bar{\mathbf{i}}_{\bar{K}} \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha$$

where $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$,

$$\mathbf{i}_{2j-1}, \bar{\mathbf{i}}_{2j-1} \quad \text{are local integrals of motion}\,,$$
$$\beta^*_{2j-1}, \gamma^*_{2j-1}, \bar{\beta}^*_{2j-1}, \bar{\gamma}^*_{2j-1} \quad \text{are fermions}\,.$$

We propose an alternative, fermionic basis of the same space

$$\mathbf{i}_K \bar{\mathbf{i}}_{\bar{K}} \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha$$

where $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$,

$\mathbf{i}_{2j-1}, \bar{\mathbf{i}}_{2j-1}$ are local integrals of motion ,

$\beta^*_{2j-1}, \gamma^*_{2j-1}, \bar{\beta}^*_{2j-1}, \bar{\gamma}^*_{2j-1}$ are fermions .

We propose an alternative, fermionic basis of the same space

$$\mathbf{i}_K \bar{\mathbf{i}}_{\bar{K}} \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha$$

where $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$,

$\mathbf{i}_{2j-1}, \bar{\mathbf{i}}_{2j-1}$ are local integrals of motion ,

$\beta^*_{2j-1}, \gamma^*_{2j-1}, \bar{\beta}^*_{2j-1}, \bar{\gamma}^*_{2j-1}$ are fermions .

We propose an alternative, fermionic basis of the same space

$$\mathbf{i}_K \bar{\mathbf{i}}_{\bar{K}} \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha$$

where $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$,

$\mathbf{i}_{2j-1}, \bar{\mathbf{i}}_{2j-1}$ are local integrals of motion,

$\beta^*_{2j-1}, \gamma^*_{2j-1}, \bar{\beta}^*_{2j-1}, \bar{\gamma}^*_{2j-1}$ are fermions.

We propose an alternative, fermionic basis of the same space

$$\mathbf{i}_K \bar{\mathbf{i}}_{\bar{K}} \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha$$

where $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$,

$$\mathbf{i}_{2j-1}, \bar{\mathbf{i}}_{2j-1} \ \text{ are local integrals of motion}\,,$$
$$\beta^*_{2j-1}, \gamma^*_{2j-1}, \bar{\beta}^*_{2j-1}, \bar{\gamma}^*_{2j-1} \ \text{ are fermions}\,.$$

We propose an alternative, fermionic basis of the same space

$$\mathbf{i}_K \bar{\mathbf{i}}_{\bar{K}} \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha$$

where $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$,

$\mathbf{i}_{2j-1}, \bar{\mathbf{i}}_{2j-1}$ are local integrals of motion,

$\beta^*_{2j-1}, \gamma^*_{2j-1}, \bar{\beta}^*_{2j-1}, \bar{\gamma}^*_{2j-1}$ are fermions.

We propose an alternative, fermionic basis of the same space

$$\mathbf{i}_K \bar{\mathbf{i}}_{\bar{K}} \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha$$

where $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$,

$\mathbf{i}_{2j-1}, \bar{\mathbf{i}}_{2j-1}$ are local integrals of motion ,

$\beta^*_{2j-1}, \gamma^*_{2j-1}, \bar{\beta}^*_{2j-1}, \bar{\gamma}^*_{2j-1}$ are fermions .

We propose an alternative, fermionic basis of the same space

$$\mathbf{i}_K \bar{\mathbf{i}}_{\bar{K}} \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha$$

where $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$,

$\mathbf{i}_{2j-1}, \bar{\mathbf{i}}_{2j-1}$ are local integrals of motion ,

$\beta^*_{2j-1}, \gamma^*_{2j-1}, \bar{\beta}^*_{2j-1}, \bar{\gamma}^*_{2j-1}$ are fermions .

We propose an alternative, fermionic basis of the same space

$$\mathbf{i}_K \bar{\mathbf{i}}_{\bar{K}} \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha$$

where $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$,

$$\mathbf{i}_{2j-1}, \bar{\mathbf{i}}_{2j-1} \text{ are local integrals of motion},$$

$$\beta^*_{2j-1}, \gamma^*_{2j-1}, \bar{\beta}^*_{2j-1}, \bar{\gamma}^*_{2j-1} \text{ are fermions}.$$

We propose an alternative, fermionic basis of the same space

$$\mathbf{i}_K \bar{\mathbf{i}}_{\bar{K}} \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha$$

where $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$,

$\mathbf{i}_{2j-1}, \bar{\mathbf{i}}_{2j-1}$ are local integrals of motion,

$\beta^*_{2j-1}, \gamma^*_{2j-1}, \bar{\beta}^*_{2j-1}, \bar{\gamma}^*_{2j-1}$ are fermions.

We propose an alternative, fermionic basis of the same space

$$\mathbf{i}_K \bar{\mathbf{i}}_{\bar{K}} \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha$$

where $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$,

$\mathbf{i}_{2j-1}, \bar{\mathbf{i}}_{2j-1}$ are local integrals of motion,

$\beta^*_{2j-1}, \gamma^*_{2j-1}, \bar{\beta}^*_{2j-1}, \bar{\gamma}^*_{2j-1}$ are fermions.

We propose an alternative, fermionic basis of the same space

$$\mathbf{i}_K \bar{\mathbf{i}}_{\bar{K}} \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha$$

where $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$,

$\mathbf{i}_{2j-1}, \bar{\mathbf{i}}_{2j-1}$ are local integrals of motion,

$\beta^*_{2j-1}, \gamma^*_{2j-1}, \bar{\beta}^*_{2j-1}, \bar{\gamma}^*_{2j-1}$ are fermions.

We propose an alternative, fermionic basis of the same space

$$\mathbf{i}_K \bar{\mathbf{i}}_{\bar{K}} \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha$$

where $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$,

$$\mathbf{i}_{2j-1}, \bar{\mathbf{i}}_{2j-1} \text{ are local integrals of motion},$$
$$\beta^*_{2j-1}, \gamma^*_{2j-1}, \bar{\beta}^*_{2j-1}, \bar{\gamma}^*_{2j-1} \text{ are fermions}.$$

We propose an alternative, fermionic basis of the same space

$$\mathbf{i}_K \bar{\mathbf{i}}_{\bar{K}} \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha$$

where $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$,

$$\mathbf{i}_{2j-1}, \bar{\mathbf{i}}_{2j-1} \text{ are local integrals of motion},$$

$$\beta^*_{2j-1}, \gamma^*_{2j-1}, \bar{\beta}^*_{2j-1}, \bar{\gamma}^*_{2j-1} \text{ are fermions}.$$

We propose an alternative, fermionic basis of the same space

$$\mathbf{i}_K \bar{\mathbf{i}}_{\bar{K}} \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha$$

where $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$,

$\mathbf{i}_{2j-1}, \bar{\mathbf{i}}_{2j-1}$ are local integrals of motion ,

$\beta^*_{2j-1}, \gamma^*_{2j-1}, \bar{\beta}^*_{2j-1}, \bar{\gamma}^*_{2j-1}$ are fermions .

We propose an alternative, fermionic basis of the same space

$$\mathbf{i}_K \bar{\mathbf{i}}_{\bar{K}} \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha$$

where $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$,

$\mathbf{i}_{2j-1}$, $\bar{\mathbf{i}}_{2j-1}$ are local integrals of motion ,

$\beta^*_{2j-1}, \gamma^*_{2j-1}, \bar{\beta}^*_{2j-1}, \bar{\gamma}^*_{2j-1}$ are fermions .

We propose an alternative, fermionic basis of the same space

$$\mathbf{i}_K \bar{\mathbf{i}}_{\bar{K}} \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha$$

where $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$,

$\mathbf{i}_{2j-1}, \bar{\mathbf{i}}_{2j-1}$ are local integrals of motion ,

$\beta^*_{2j-1}, \gamma^*_{2j-1}, \bar{\beta}^*_{2j-1}, \bar{\gamma}^*_{2j-1}$ are fermions .

We propose an alternative, fermionic basis of the same space

$$\mathbf{i}_K \bar{\mathbf{i}}_{\bar{K}} \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha$$

where $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$,

$$\mathbf{i}_{2j-1}, \bar{\mathbf{i}}_{2j-1} \text{ are local integrals of motion}\,,$$
$$\beta^*_{2j-1}, \gamma^*_{2j-1}, \bar{\beta}^*_{2j-1}, \bar{\gamma}^*_{2j-1} \text{ are fermions}\,.$$

We propose an alternative, fermionic basis of the same space

$$\mathbf{i}_K \bar{\mathbf{i}}_{\bar{K}} \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha$$

where $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$,

$\mathbf{i}_{2j-1}, \bar{\mathbf{i}}_{2j-1}$ are local integrals of motion ,

$\beta^*_{2j-1}, \gamma^*_{2j-1}, \bar{\beta}^*_{2j-1}, \bar{\gamma}^*_{2j-1}$ are fermions .

We propose an alternative, fermionic basis of the same space

$$\mathbf{i}_K \bar{\mathbf{i}}_{\bar{K}} \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha$$

where $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$,

$\mathbf{i}_{2j-1}, \bar{\mathbf{i}}_{2j-1}$ are local integrals of motion ,

$\beta^*_{2j-1}, \gamma^*_{2j-1}, \bar{\beta}^*_{2j-1}, \bar{\gamma}^*_{2j-1}$ are fermions .

We propose an alternative, fermionic basis of the same space

$$\mathbf{i}_K \bar{\mathbf{i}}_{\bar{K}} \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha$$

where $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$,

$\mathbf{i}_{2j-1}, \bar{\mathbf{i}}_{2j-1}$ are local integrals of motion,

$\beta^*_{2j-1}, \gamma^*_{2j-1}, \bar{\beta}^*_{2j-1}, \bar{\gamma}^*_{2j-1}$ are fermions.

We propose an alternative, fermionic basis of the same space

$$\mathbf{i}_K \bar{\mathbf{i}}_{\bar{K}} \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha$$

where $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$,

$\mathbf{i}_{2j-1}, \bar{\mathbf{i}}_{2j-1}$ are local integrals of motion ,

$\beta^*_{2j-1}, \gamma^*_{2j-1}, \bar{\beta}^*_{2j-1}, \bar{\gamma}^*_{2j-1}$ are fermions .

We propose an alternative, fermionic basis of the same space

$$\mathbf{i}_K \bar{\mathbf{i}}_{\bar{K}} \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha$$

where $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$,

$$\mathbf{i}_{2j-1}, \bar{\mathbf{i}}_{2j-1} \quad \text{are local integrals of motion}\,,$$

$$\beta^*_{2j-1}, \gamma^*_{2j-1}, \bar{\beta}^*_{2j-1}, \bar{\gamma}^*_{2j-1} \quad \text{are fermions}\,.$$

We propose an alternative, fermionic basis of the same space

$$\mathbf{i}_K \bar{\mathbf{i}}_{\bar{K}} \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha$$

where $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$,

$\mathbf{i}_{2j-1}, \bar{\mathbf{i}}_{2j-1}$ are local integrals of motion.

$\beta^*_{2j-1}, \gamma^*_{2j-1}, \bar{\beta}^*_{2j-1}, \bar{\gamma}^*_{2j-1}$ are fermions.

We propose an alternative, fermionic basis of the same space

$$\mathbf{i}_K \bar{\mathbf{i}}_{\bar{K}} \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha$$

where $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$,

$$\mathbf{i}_{2j-1}, \bar{\mathbf{i}}_{2j-1} \ \text{ are local integrals of motion}\,,$$

$$\beta^*_{2j-1}, \gamma^*_{2j-1}, \bar{\beta}^*_{2j-1}, \bar{\gamma}^*_{2j-1} \ \text{ are fermions}\,.$$

We propose an alternative, fermionic basis of the same space

$$\mathbf{i}_K \bar{\mathbf{i}}_{\bar{K}} \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha$$

where $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$,

$$\mathbf{i}_{2j-1},\ \bar{\mathbf{i}}_{2j-1} \ \text{ are local integrals of motion}\,,$$
$$\beta^*_{2j-1}, \gamma^*_{2j-1}, \bar{\beta}^*_{2j-1}, \bar{\gamma}^*_{2j-1} \ \text{ are fermions}\,.$$

We propose an alternative, fermionic basis of the same space

$$\mathbf{i}_K \bar{\mathbf{i}}_{\bar{K}} \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha$$

where $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$,

$\mathbf{i}_{2j-1}, \bar{\mathbf{i}}_{2j-1}$ are local integrals of motion,

$\beta^*_{2j-1}, \gamma^*_{2j-1}, \bar{\beta}^*_{2j-1}, \bar{\gamma}^*_{2j-1}$ are fermions.

We propose an alternative, fermionic basis of the same space

$$\mathbf{i}_K \bar{\mathbf{i}}_{\bar{K}} \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha$$

where $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$,

$\mathbf{i}_{2j-1}, \bar{\mathbf{i}}_{2j-1}$ are local integrals of motion ,

$\beta^*_{2j-1}, \gamma^*_{2j-1}, \bar{\beta}^*_{2j-1}, \bar{\gamma}^*_{2j-1}$ are fermions .

NB: The fermions act not on states but on fields.
They have nothing to do with the Jordan-Wigner fermions.

We propose an alternative, fermionic basis of the same space

$$\mathbf{i}_K \bar{\mathbf{i}}_{\bar{K}} \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha$$

where $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$,

$\mathbf{i}_{2j-1}, \bar{\mathbf{i}}_{2j-1}$ are local integrals of motion ,

$\beta^*_{2j-1}, \gamma^*_{2j-1}, \bar{\beta}^*_{2j-1}, \bar{\gamma}^*_{2j-1}$ are fermions .

NB: The fermions act not on states but on fields.
They have nothing to do with the Jordan-Wigner fermions.

We propose an alternative, fermionic basis of the same space

$$\mathbf{i}_K \bar{\mathbf{i}}_{\bar{K}} \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha$$

where $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$,

$\mathbf{i}_{2j-1}, \bar{\mathbf{i}}_{2j-1}$ are local integrals of motion,

$\beta^*_{2j-1}, \gamma^*_{2j-1}, \bar{\beta}^*_{2j-1}, \bar{\gamma}^*_{2j-1}$ are fermions.

NB: The fermions act not on states but on fields.
They have nothing to do with the Jordan-Wigner fermions.

We propose an alternative, fermionic basis of the same space

$$\mathbf{i}_K \bar{\mathbf{i}}_{\bar{K}} \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha$$

where $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$,

$\mathbf{i}_{2j-1}, \bar{\mathbf{i}}_{2j-1}$ are local integrals of motion ,

$\beta^*_{2j-1}, \gamma^*_{2j-1}, \bar{\beta}^*_{2j-1}, \bar{\gamma}^*_{2j-1}$ are fermions .

NB: The fermions act not on states but on fields.
They have nothing to do with the Jordan-Wigner fermions.

We propose an alternative, fermionic basis of the same space

$$\mathbf{i}_K \bar{\mathbf{i}}_{\bar{K}} \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha$$

where $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$,

$$\mathbf{i}_{2j-1}, \bar{\mathbf{i}}_{2j-1} \text{ are local integrals of motion},$$

$$\beta^*_{2j-1}, \gamma^*_{2j-1}, \bar{\beta}^*_{2j-1}, \bar{\gamma}^*_{2j-1} \text{ are fermions}.$$

NB: The fermions act not on states but on fields.
They have nothing to do with the Jordan-Wigner fermions.

We propose an alternative, fermionic basis of the same space

$$\mathbf{i}_K \bar{\mathbf{i}}_{\bar{K}} \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha$$

where $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$,

$$\mathbf{i}_{2j-1}, \bar{\mathbf{i}}_{2j-1} \quad \text{are local integrals of motion}\,,$$

$$\beta^*_{2j-1}, \gamma^*_{2j-1}, \bar{\beta}^*_{2j-1}, \bar{\gamma}^*_{2j-1} \quad \text{are fermions}\,.$$

NB: The fermions act not on states but on fields.
They have nothing to do with the Jordan-Wigner fermions.

We propose an alternative, fermionic basis of the same space

$$\mathbf{i}_K \bar{\mathbf{i}}_{\bar{K}} \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha$$

where $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$,

$\mathbf{i}_{2j-1}, \bar{\mathbf{i}}_{2j-1}$ are local integrals of motion ,

$\beta^*_{2j-1}, \gamma^*_{2j-1}, \bar{\beta}^*_{2j-1}, \bar{\gamma}^*_{2j-1}$ are fermions .

NB: The fermions act not on states but on fields.
They have nothing to do with the Jordan-Wigner fermions.

We propose an alternative, fermionic basis of the same space

$$\mathbf{i}_K \bar{\mathbf{i}}_{\bar{K}} \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha$$

where $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$,

$\mathbf{i}_{2j-1}, \bar{\mathbf{i}}_{2j-1}$ are local integrals of motion,

$\beta^*_{2j-1}, \gamma^*_{2j-1}, \bar{\beta}^*_{2j-1}, \bar{\gamma}^*_{2j-1}$ are fermions.

NB: The fermions act not on states but on fields.
They have nothing to do with the Jordan-Wigner fermions.

We propose an alternative, fermionic basis of the same space

$$\mathbf{i}_K \bar{\mathbf{i}}_{\bar{K}} \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha$$

where $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$,

$$\mathbf{i}_{2j-1}, \bar{\mathbf{i}}_{2j-1} \quad \text{are local integrals of motion}\,,$$

$$\beta^*_{2j-1}, \gamma^*_{2j-1}, \bar{\beta}^*_{2j-1}, \bar{\gamma}^*_{2j-1} \quad \text{are fermions}\,.$$

NB: The fermions act not on states but on fields.
They have nothing to do with the Jordan-Wigner fermions.

We propose an alternative, fermionic basis of the same space

$$\mathbf{i}_K \bar{\mathbf{i}}_{\bar{K}} \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha$$

where $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$,

$$\mathbf{i}_{2j-1}, \bar{\mathbf{i}}_{2j-1} \text{ are local integrals of motion}\,,$$
$$\beta^*_{2j-1}, \gamma^*_{2j-1}, \bar{\beta}^*_{2j-1}, \bar{\gamma}^*_{2j-1} \text{ are fermions}\,.$$

NB: The fermions act not on states but on fields.
They have nothing to do with the Jordan-Wigner fermions.

We propose an alternative, fermionic basis of the same space

$$\mathbf{i}_K \bar{\mathbf{i}}_{\bar{K}} \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha$$

where $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$,

$$\mathbf{i}_{2j-1}, \bar{\mathbf{i}}_{2j-1} \text{ are local integrals of motion},$$
$$\beta^*_{2j-1}, \gamma^*_{2j-1}, \bar{\beta}^*_{2j-1}, \bar{\gamma}^*_{2j-1} \text{ are fermions}.$$

NB: The fermions act not on states but on fields.
They have nothing to do with the Jordan-Wigner fermions.

We propose an alternative, fermionic basis of the same space

$$\mathbf{i}_K \bar{\mathbf{i}}_{\bar{K}} \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha$$

where $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$,

$\mathbf{i}_{2j-1}, \bar{\mathbf{i}}_{2j-1}$ are local integrals of motion ,

$\beta^*_{2j-1}, \gamma^*_{2j-1}, \bar{\beta}^*_{2j-1}, \bar{\gamma}^*_{2j-1}$ are fermions .

NB: The fermions act not on states but on fields.
They have nothing to do with the Jordan-Wigner fermions.

We propose an alternative, fermionic basis of the same space

$$\mathbf{i}_K \bar{\mathbf{i}}_{\bar{K}} \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha$$

where $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$,

$$\mathbf{i}_{2j-1}, \bar{\mathbf{i}}_{2j-1} \text{ are local integrals of motion},$$
$$\beta^*_{2j-1}, \gamma^*_{2j-1}, \bar{\beta}^*_{2j-1}, \bar{\gamma}^*_{2j-1} \text{ are fermions}.$$

NB: The fermions act not on states but on fields.
They have nothing to do with the Jordan-Wigner fermions.

We propose an alternative, fermionic basis of the same space

$$\mathbf{i}_K \bar{\mathbf{i}}_{\bar{K}} \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha$$

where $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$,

$\mathbf{i}_{2j-1}, \bar{\mathbf{i}}_{2j-1}$ are local integrals of motion,

$\beta^*_{2j-1}, \gamma^*_{2j-1}, \bar{\beta}^*_{2j-1}, \bar{\gamma}^*_{2j-1}$ are fermions.

NB: The fermions act not on states but on fields.
They have nothing to do with the Jordan-Wigner fermions.

We propose an alternative, fermionic basis of the same space

$$\mathbf{i}_K \bar{\mathbf{i}}_{\bar{K}} \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha$$

where $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$,

$$\mathbf{i}_{2j-1}, \bar{\mathbf{i}}_{2j-1} \ \text{ are local integrals of motion}\,,$$

$$\beta^*_{2j-1}, \gamma^*_{2j-1}, \bar{\beta}^*_{2j-1}, \bar{\gamma}^*_{2j-1} \ \text{ are fermions}\,.$$

NB: The fermions act not on states but on fields.
They have nothing to do with the Jordan-Wigner fermions.

We propose an alternative, fermionic basis of the same space

$$\mathbf{i}_K \bar{\mathbf{i}}_{\bar{K}} \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha$$

where $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$,

$\mathbf{i}_{2j-1}, \bar{\mathbf{i}}_{2j-1}$ are local integrals of motion ,

$\beta^*_{2j-1}, \gamma^*_{2j-1}, \bar{\beta}^*_{2j-1}, \bar{\gamma}^*_{2j-1}$ are fermions .

NB: The fermions act not on states but on fields.
They have nothing to do with the Jordan-Wigner fermions.

We propose an alternative, fermionic basis of the same space

$$\mathbf{i}_K \bar{\mathbf{i}}_{\bar{K}} \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha$$

where $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$,

$$\mathbf{i}_{2j-1}, \bar{\mathbf{i}}_{2j-1} \text{ are local integrals of motion},$$
$$\beta^*_{2j-1}, \gamma^*_{2j-1}, \bar{\beta}^*_{2j-1}, \bar{\gamma}^*_{2j-1} \text{ are fermions}.$$

NB: The fermions act not on states but on fields.
They have nothing to do with the Jordan-Wigner fermions.

We propose an alternative, fermionic basis of the same space

$$\mathbf{i}_K \bar{\mathbf{i}}_{\bar{K}} \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha$$

where $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$,

$\mathbf{i}_{2j-1}, \bar{\mathbf{i}}_{2j-1}$ are local integrals of motion ,

$\beta^*_{2j-1}, \gamma^*_{2j-1}, \bar{\beta}^*_{2j-1}, \bar{\gamma}^*_{2j-1}$ are fermions .

NB: The fermions act not on states but on fields.
They have nothing to do with the Jordan-Wigner fermions.

We propose an alternative, fermionic basis of the same space

$$\mathbf{i}_K \bar{\mathbf{i}}_{\bar{K}} \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha$$

where $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$,

$$\mathbf{i}_{2j-1}, \bar{\mathbf{i}}_{2j-1} \quad \text{are local integrals of motion}\,,$$
$$\beta^*_{2j-1}, \gamma^*_{2j-1}, \bar{\beta}^*_{2j-1}, \bar{\gamma}^*_{2j-1} \quad \text{are fermions}\,.$$

NB: The fermions act not on states but on fields.
They have nothing to do with the Jordan-Wigner fermions.

We propose an alternative, fermionic basis of the same space

$$\mathbf{i}_K \bar{\mathbf{i}}_{\bar{K}} \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha$$

where $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$,

$$\mathbf{i}_{2j-1},\ \bar{\mathbf{i}}_{2j-1} \quad \text{are local integrals of motion},$$

$$\beta^*_{2j-1}, \gamma^*_{2j-1}, \bar{\beta}^*_{2j-1}, \bar{\gamma}^*_{2j-1} \quad \text{are fermions}.$$

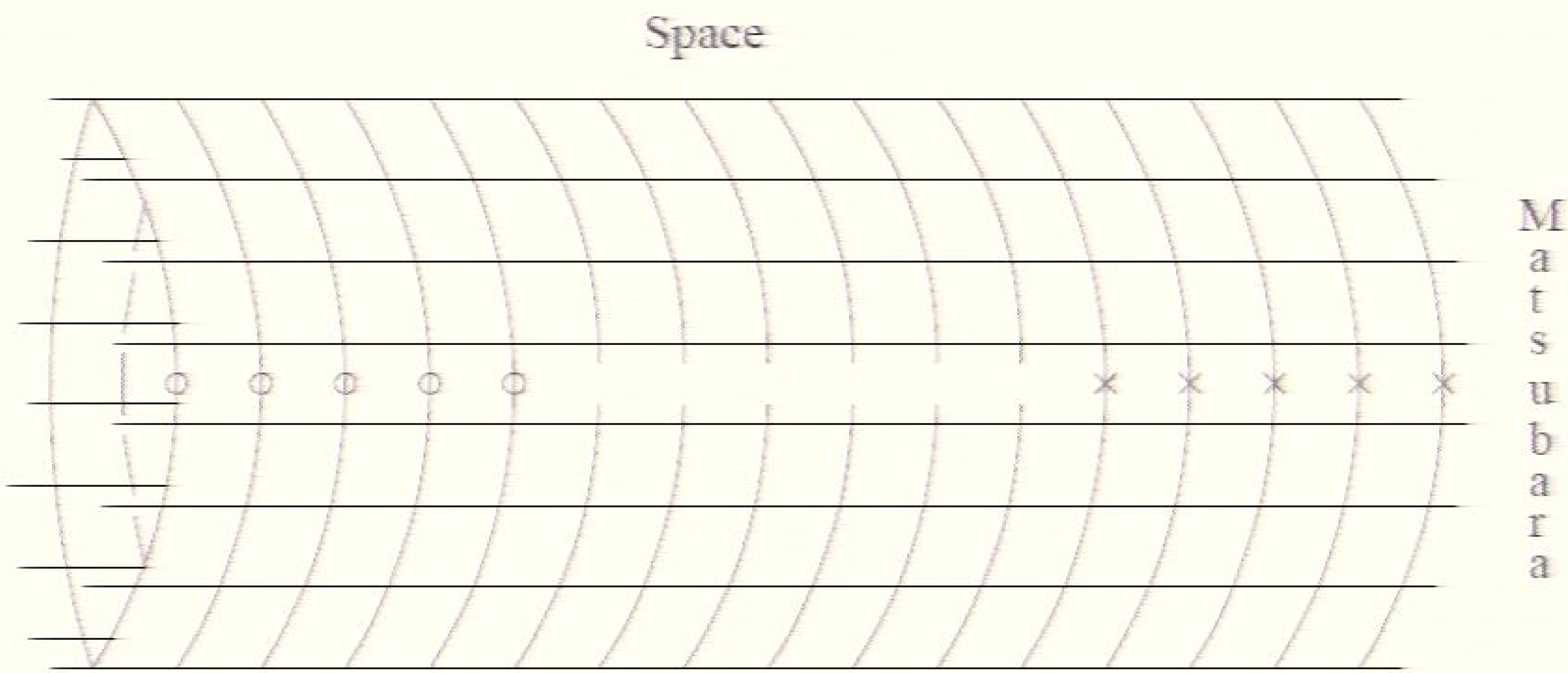
<u>NB</u>: The fermions act not on states but on fields.
They have nothing to do with the Jordan-Wigner fermions.

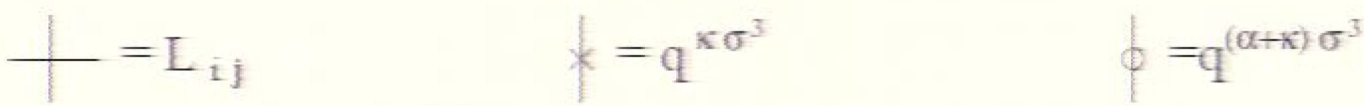
Fermionic basis on the lattice

We consider a 6 vertex model on a cylinder

Fermionic basis on the lattice

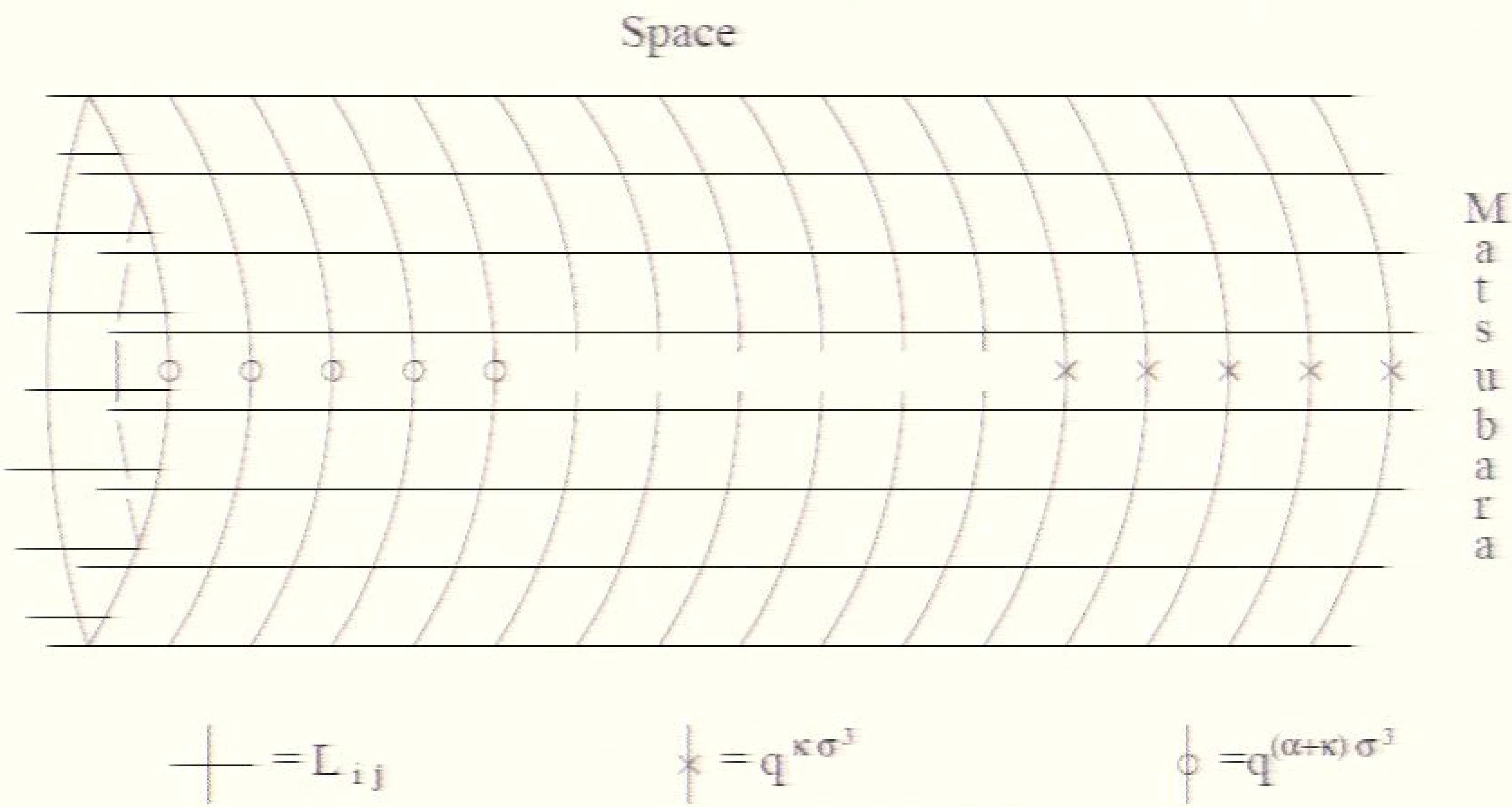
We consider a 6 vertex model on a cylinder





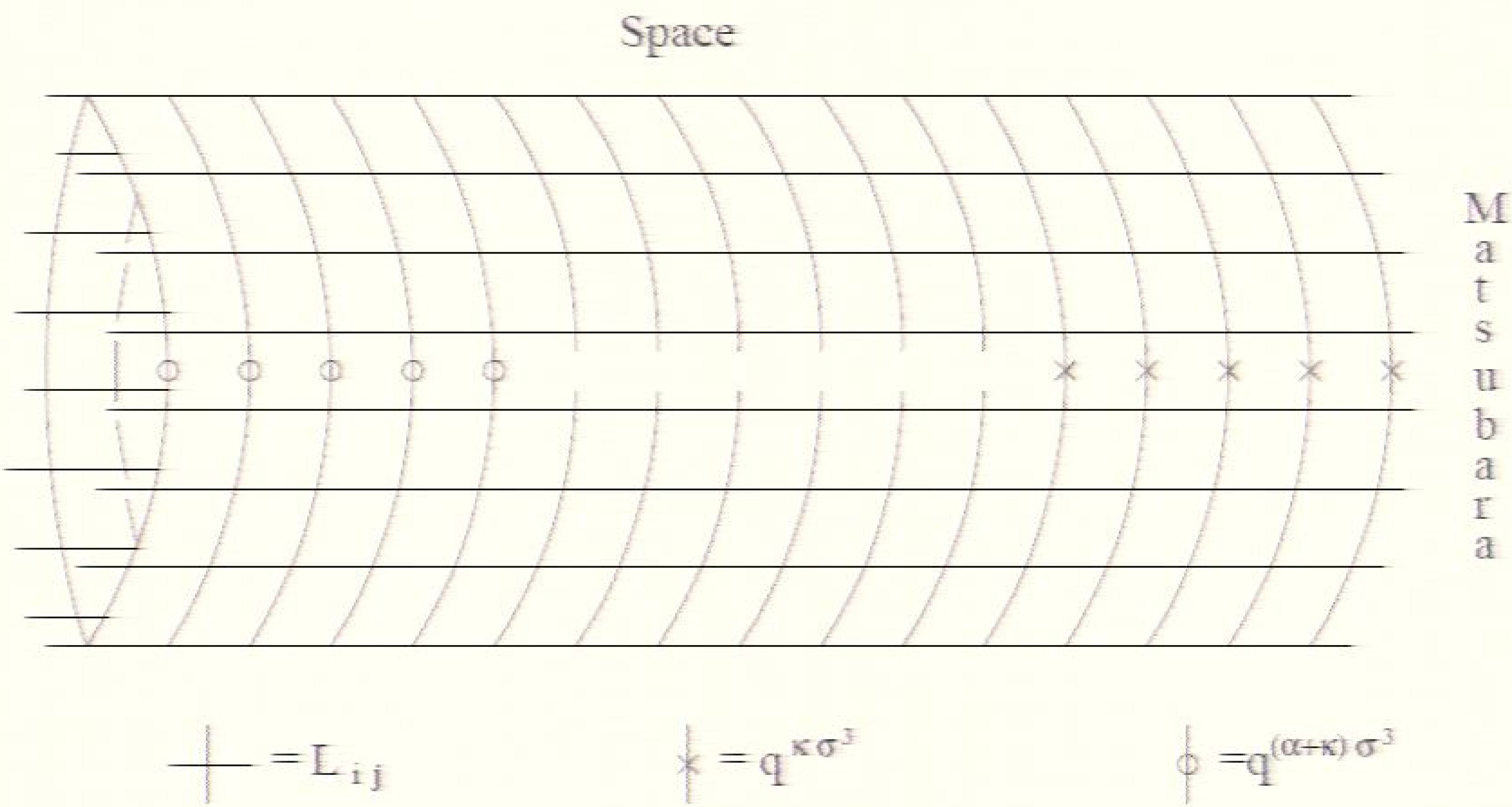
Fermionic basis on the lattice

We consider a 6 vertex model on a cylinder



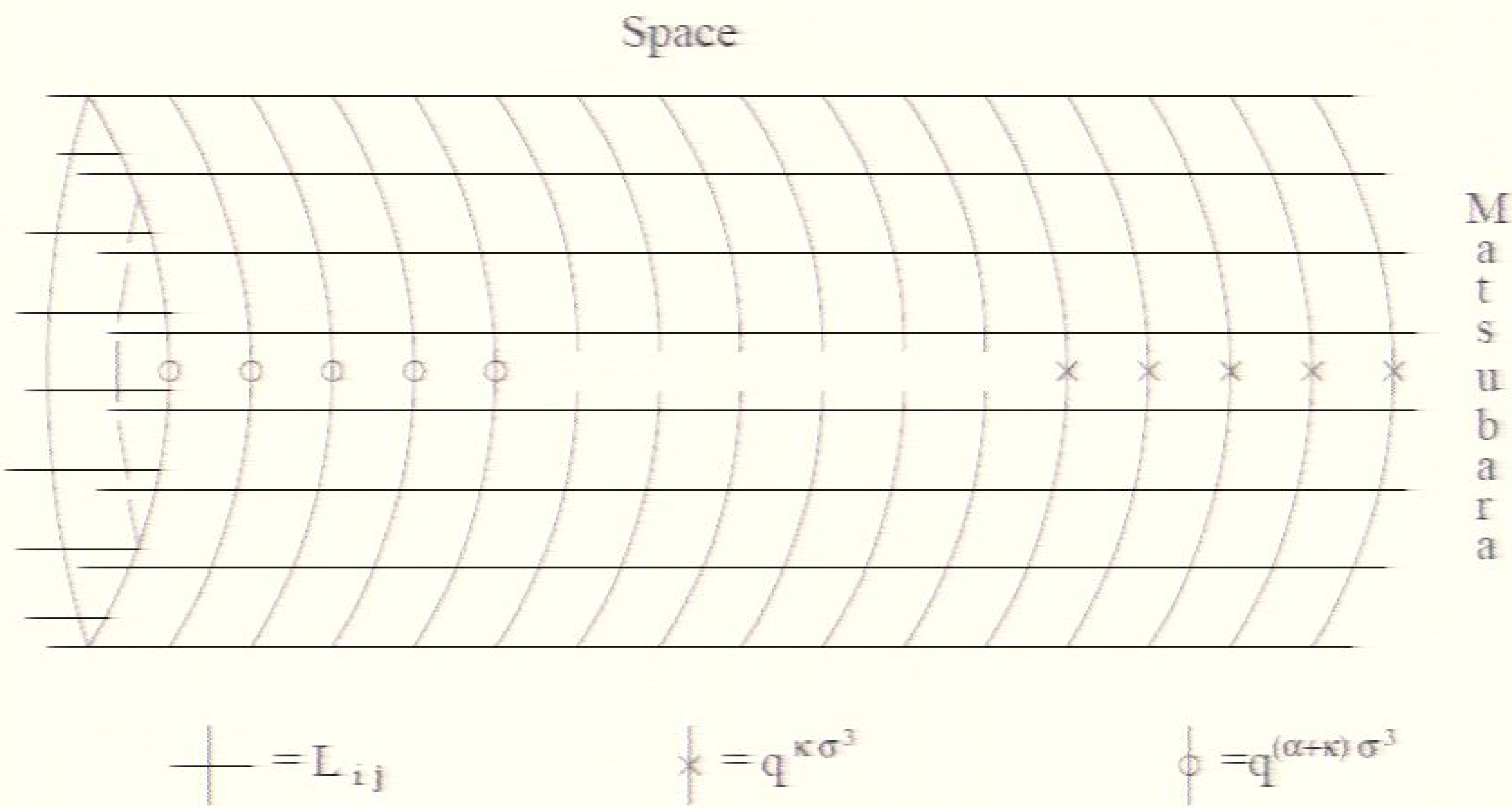
Fermionic basis on the lattice

We consider a 6 vertex model on a cylinder



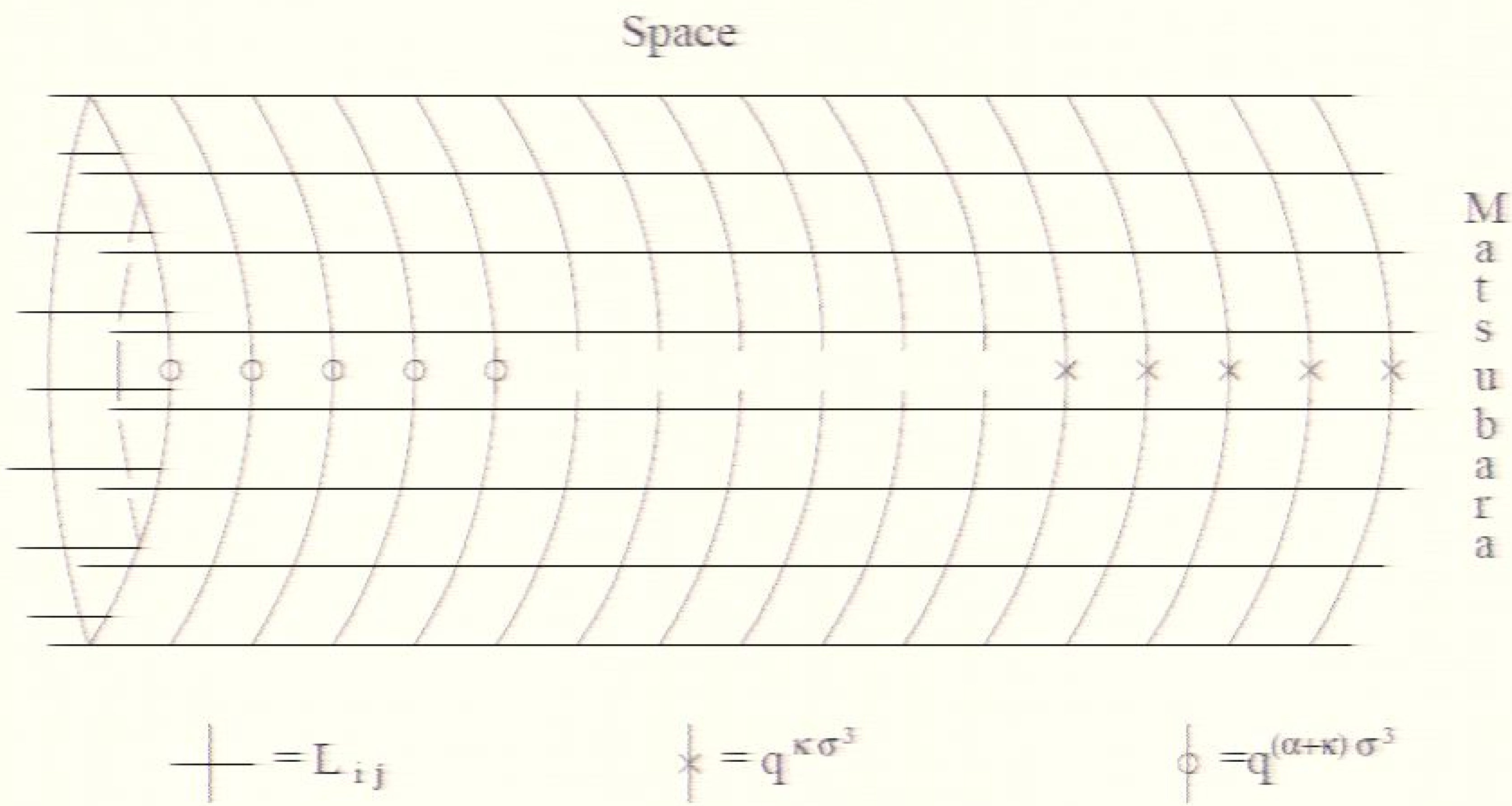
Fermionic basis on the lattice

We consider a 6 vertex model on a cylinder



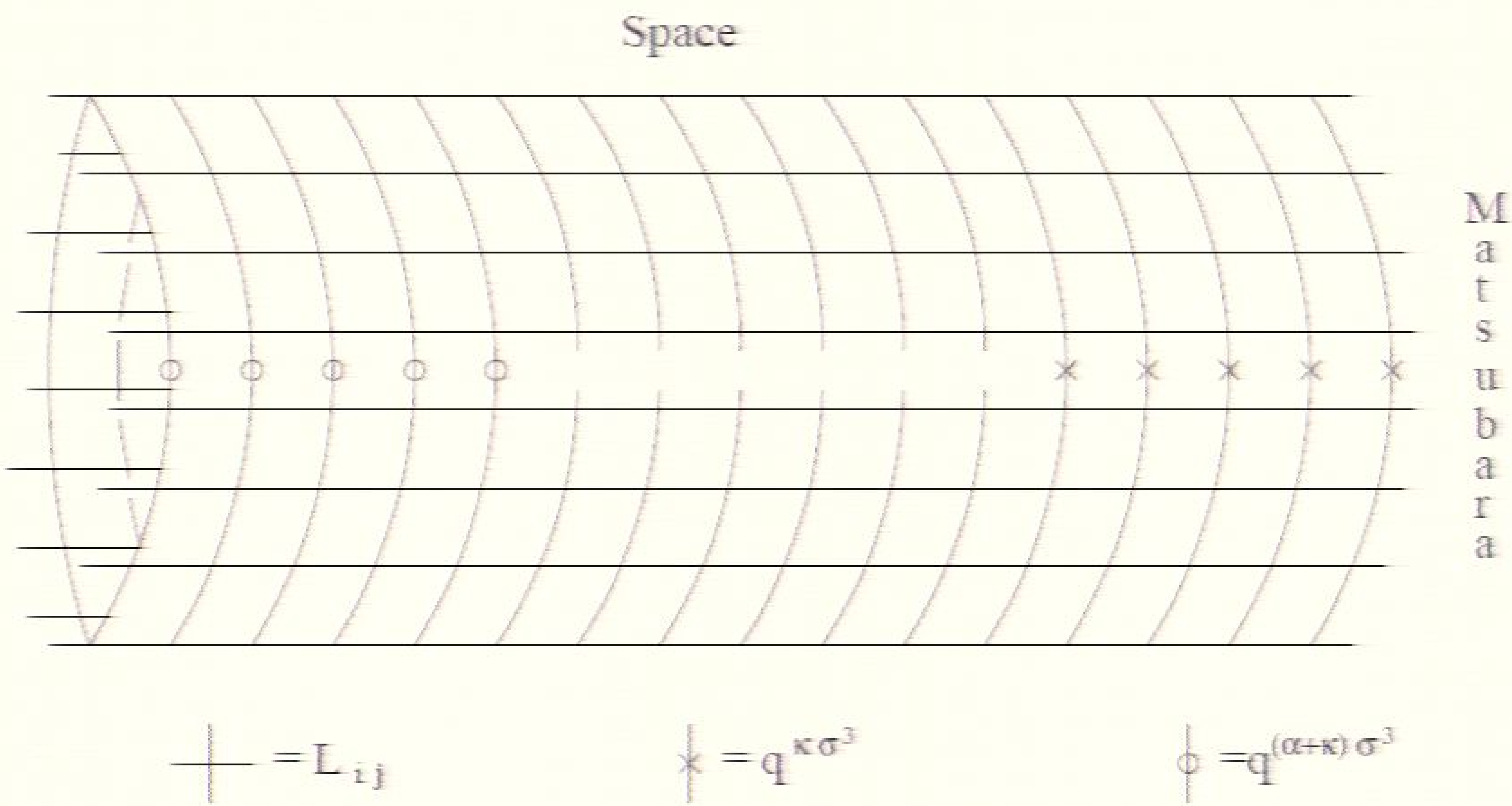
Fermionic basis on the lattice

We consider a 6 vertex model on a cylinder



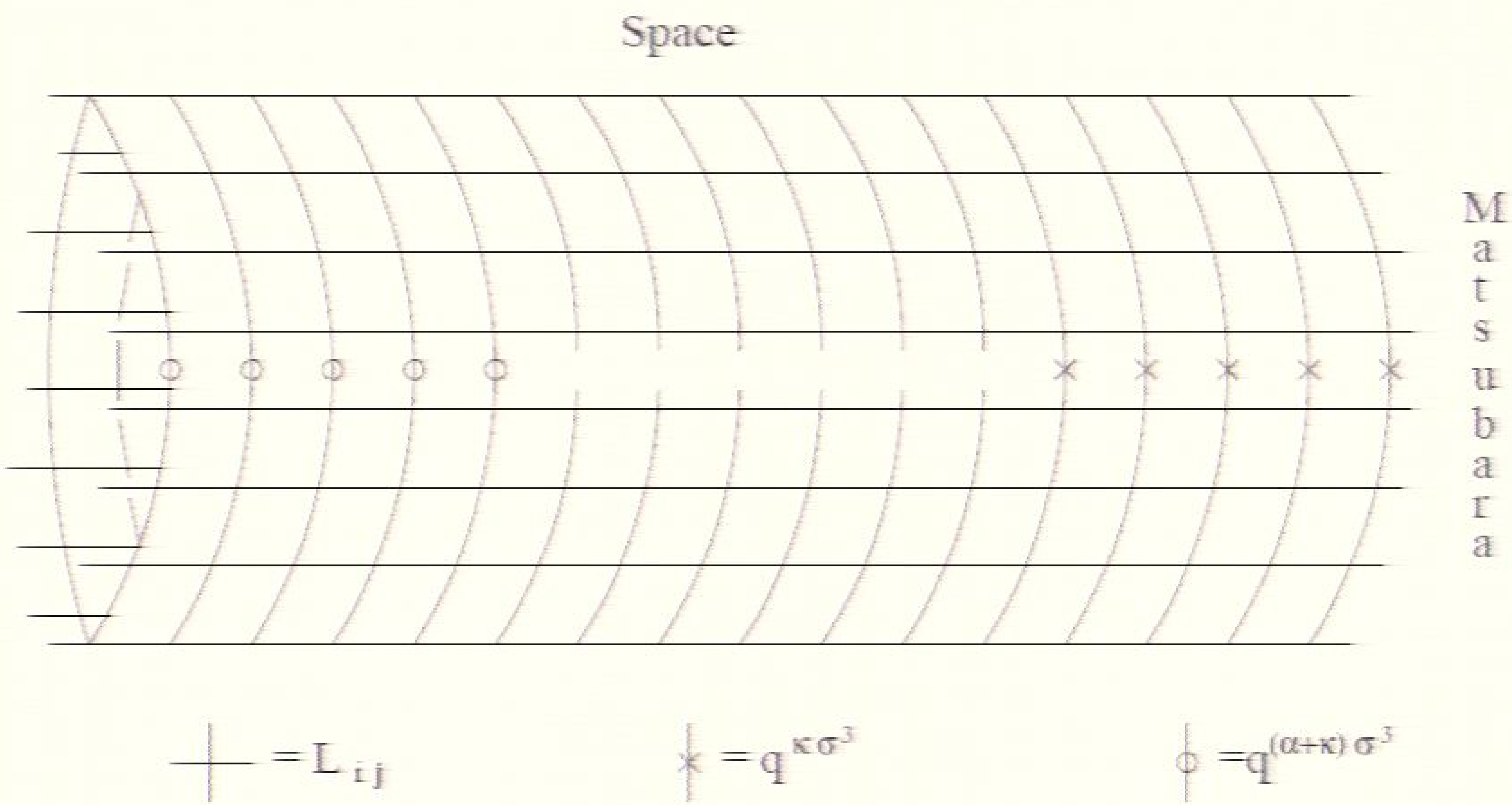
Fermionic basis on the lattice

We consider a 6 vertex model on a cylinder



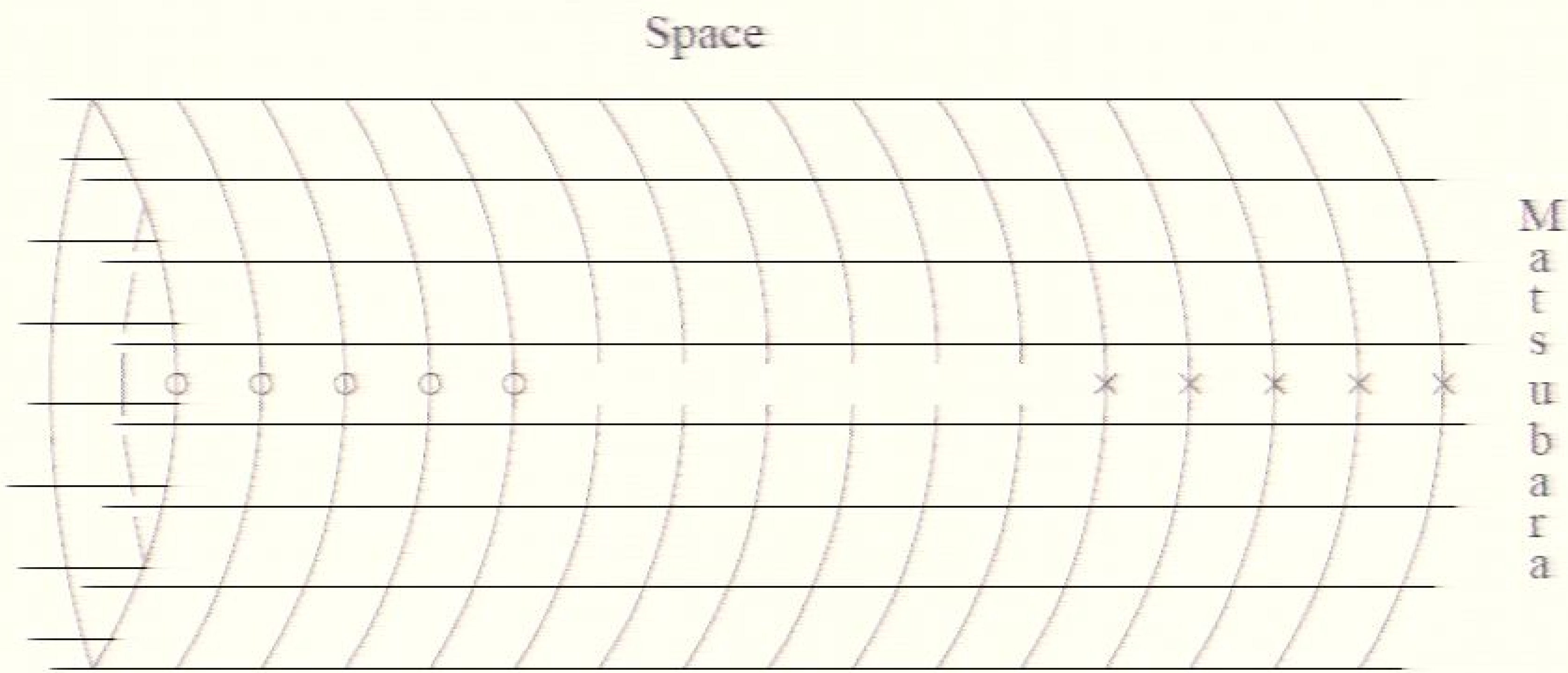
Fermionic basis on the lattice

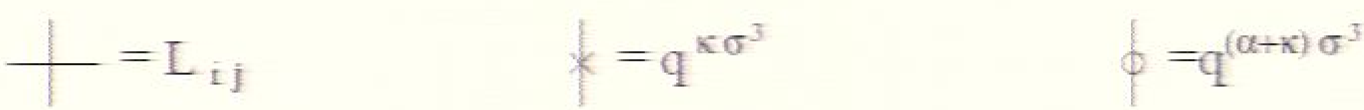
We consider a 6 vertex model on a cylinder



Fermionic basis on the lattice

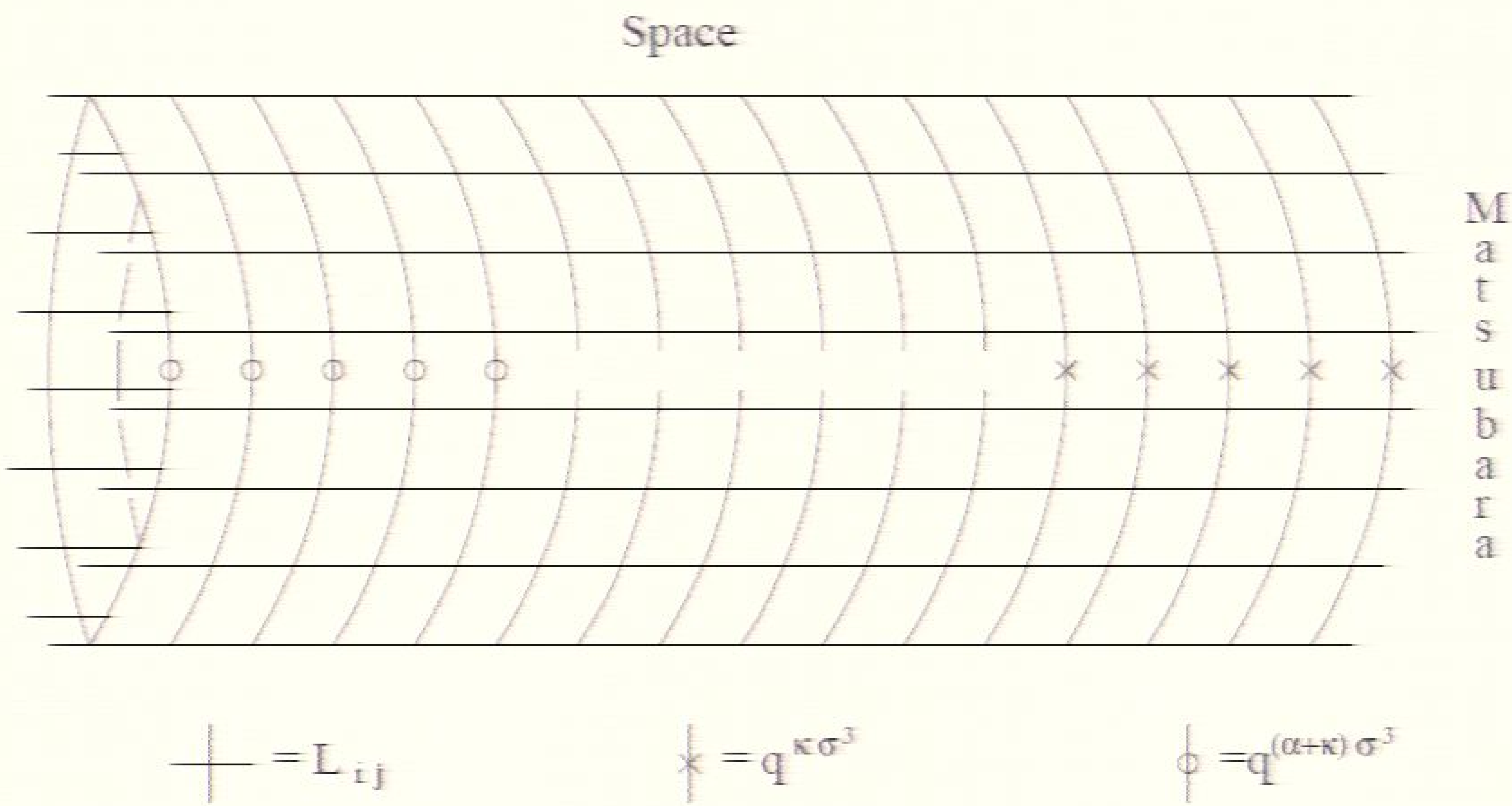
We consider a 6 vertex model on a cylinder





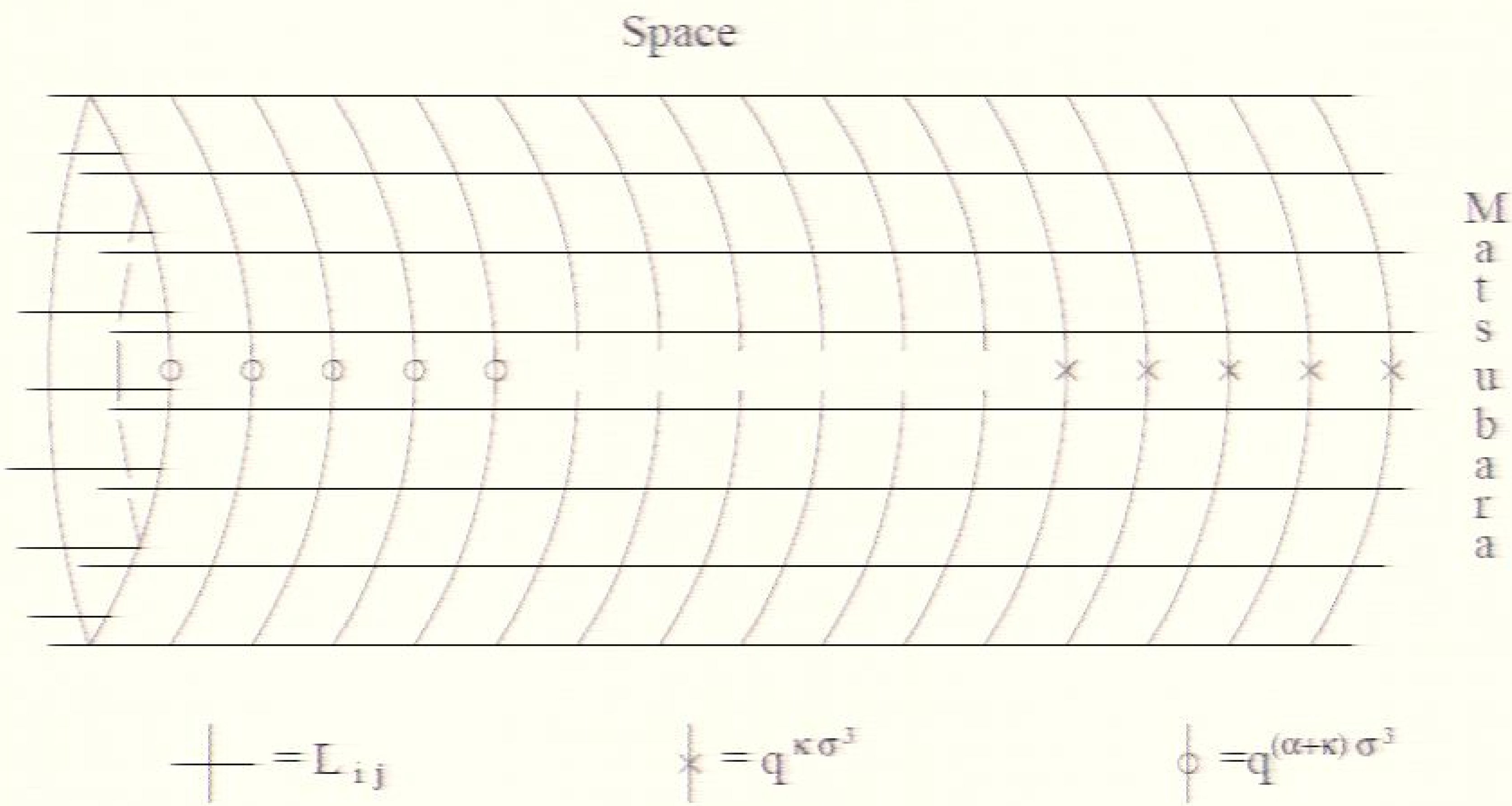
Fermionic basis on the lattice

We consider a 6 vertex model on a cylinder



Fermionic basis on the lattice

We consider a 6 vertex model on a cylinder



Analog of Φ_α : $q^{2\alpha S(0)}$, $\quad S(0) = \frac{1}{2}\sum_{j=-\infty}^{0} \sigma_j^3$

Analog of Φ_α : $q^{2\alpha S(0)}$, $S(0) = \frac{1}{2}\sum_{j=-\infty}^{0} \sigma_j^3$

Analog of descendants : $q^{2\alpha S(0)}\mathcal{O}$, $\mathcal{O}$: local

Analog of Φ_α : $q^{2\alpha S(0)}$, $S(0) = \frac{1}{2}\sum_{j=-\infty}^{0} \sigma_j^3$

Analog of descendants : $q^{2\alpha S(0)}\mathcal{O}$, $\mathcal{O}$: local

Analog of Φ_α : $q^{2\alpha S(0)}$, $\quad S(0) = \frac{1}{2}\sum_{j=-\infty}^{0} \sigma_j^3$

Analog of descendants : $q^{2\alpha S(0)}\mathcal{O}$, $\quad \mathcal{O}$: local

Space of quasi-local operators

$$\mathcal{W}^{(\alpha)} = \bigoplus_{s\in\mathbb{Z}} \mathcal{W}_{\alpha-s,s},$$

$$\mathcal{W}_{\alpha-s,s} = \{q^{2(\alpha-s)S(0)}\mathcal{O} \mid \mathcal{O}\text{: local, spin } s\}$$

We consider the expectation values

Analog of Φ_α : $q^{2\alpha S(0)}$, $S(0) = \frac{1}{2}\sum_{j=-\infty}^{0} \sigma_j^3$

Analog of descendants : $q^{2\alpha S(0)}\mathcal{O}$, $\mathcal{O}$: local

Space of quasi-local operators

$$\mathcal{W}^{(\alpha)} = \bigoplus_{s\in\mathbb{Z}} \mathcal{W}_{\alpha-s,s},$$

$$\mathcal{W}_{\alpha-s,s} = \{q^{2(\alpha-s)S(0)}\mathcal{O} \mid \mathcal{O}\text{: local, spin } s\}$$

Analog of Φ_α : $q^{2\alpha S(0)}$, $\qquad S(0) = \frac{1}{2}\sum_{j=-\infty}^{0} \sigma_j^3$

Analog of descendants : $q^{2\alpha S(0)}\mathcal{O}$, $\qquad \mathcal{O}$: local

Space of quasi-local operators

$$\mathcal{W}^{(\alpha)} = \bigoplus_{s\in\mathbb{Z}} \mathcal{W}_{\alpha-s,s},$$

$$\mathcal{W}_{\alpha-s,s} = \{q^{2(\alpha-s)S(0)}\mathcal{O} \mid \mathcal{O}\text{: local, spin } s\}$$

Analog of Φ_α : $q^{2\alpha S(0)}$, $\quad S(0) = \frac{1}{2}\sum_{j=-\infty}^{0} \sigma_j^3$

Analog of descendants : $q^{2\alpha S(0)}\mathcal{O}$, $\quad \mathcal{O}$: local

Space of quasi-local operators

$$\mathcal{W}^{(\alpha)} = \bigoplus_{s\in\mathbb{Z}} \mathcal{W}_{\alpha-s,s},$$

$$\mathcal{W}_{\alpha-s,s} = \{q^{2(\alpha-s)S(0)}\mathcal{O} \mid \mathcal{O}\text{: local, spin } s\}$$

Analog of Φ_α : $q^{2\alpha S(0)}$, $S(0) = \frac{1}{2}\sum_{j=-\infty}^{0} \sigma_j^3$

Analog of descendants : $q^{2\alpha S(0)}\mathcal{O}$, $\mathcal{O}$: local

Space of quasi-local operators

$$\mathcal{W}^{(\alpha)} = \bigoplus_{s\in\mathbb{Z}} \mathcal{W}_{\alpha-s,s},$$

$$\mathcal{W}_{\alpha-s,s} = \{q^{2(\alpha-s)S(0)}\mathcal{O} \mid \mathcal{O}\text{: local, spin } s\}$$

We consider the expectation values

We consider the expectation values

$$Z_{\mathbf{n}}\left\{ q^{2\alpha S(0)}\mathcal{O}\right\} = \frac{\langle \kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\left(T_{\mathbf{S},\mathbf{M}} q^{2\kappa S+2\alpha S(0)}\mathcal{O}\right)|\kappa\rangle}{\langle \kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\left(T_{\mathbf{S},\mathbf{M}} q^{2\kappa S+2\alpha S(0)}\right)|\kappa\rangle},$$

We consider the expectation values

$$Z_{\mathbf{n}}\left\{q^{2\alpha S(0)}\mathcal{O}\right\} = \frac{\langle \kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\left(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\mathcal{O}\right)|\kappa\rangle}{\langle \kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\left(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\right)|\kappa\rangle},$$

where

$$T_{\mathbf{S},\mathbf{M}} = \overset{\curvearrowright}{\prod_{j=-\infty}^{\infty}} T_{j,\mathbf{M}}(1), \quad T_{j,\mathbf{M}}(\zeta) = \overset{\curvearrowleft}{\prod_{\mathbf{m}=1}^{\mathbf{n}}} L_{j,\mathbf{m}}(\zeta),$$

$$L_{j,\mathbf{m}}(\zeta) = q^{-\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta^2 q^{\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta(q-q^{-1})(\sigma_j^+\sigma_{\mathbf{m}}^- + \sigma_j^-\sigma_{\mathbf{m}}^+),$$

and $|\kappa\rangle$, $\langle\kappa|$ are eigen(co)vector of the transfer matirx

$$T_{\mathbf{M}}(\zeta,\kappa) = \mathrm{Tr}_j\left[T_{j,\mathbf{M}}(\zeta)q^{\kappa\sigma_j^3}\right].$$

We consider the expectation values

$$Z_{\mathbf{n}}\left\{q^{2\alpha S(0)}\mathcal{O}\right\} = \frac{\langle\kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\left(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\mathcal{O}\right)|\kappa\rangle}{\langle\kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\left(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\right)|\kappa\rangle},$$

where

$$T_{\mathbf{S},\mathbf{M}} = \prod_{j=-\infty}^{\stackrel{\curvearrowright}{\infty}} T_{j,\mathbf{M}}(1), \quad T_{j,\mathbf{M}}(\zeta) = \prod_{\mathbf{m}=1}^{\stackrel{\curvearrowleft}{\mathbf{n}}} L_{j,\mathbf{m}}(\zeta),$$

$$L_{j,\mathbf{m}}(\zeta) = q^{-\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta^2 q^{\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta(q-q^{-1})(\sigma_j^+\sigma_{\mathbf{m}}^- + \sigma_j^-\sigma_{\mathbf{m}}^+),$$

and $|\kappa\rangle$, $\langle\kappa|$ are eigen(co)vector of the transfer matirx

$$T_{\mathbf{M}}(\zeta,\kappa) = \mathrm{Tr}_j\left[T_{j,\mathbf{M}}(\zeta)q^{\kappa\sigma_j^3}\right].$$

We consider the expectation values

$$Z_{\mathbf{n}}\Big\{q^{2\alpha S(0)}\mathcal{O}\Big\} = \frac{\langle\kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\Big(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\mathcal{O}\Big)|\kappa\rangle}{\langle\kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\Big(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\Big)|\kappa\rangle},$$

where

$$T_{\mathbf{S},\mathbf{M}} = \prod_{j=-\infty}^{\overset{\curvearrowright}{\infty}} T_{j,\mathbf{M}}(1)\,, \quad T_{j,\mathbf{M}}(\zeta) = \prod_{\mathbf{m}=1}^{\overset{\curvearrowleft}{\mathbf{n}}} L_{j,\mathbf{m}}(\zeta)\,,$$

$$L_{j,\mathbf{m}}(\zeta) = q^{-\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta^2 q^{\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta(q-q^{-1})(\sigma_j^+\sigma_{\mathbf{m}}^- + \sigma_j^-\sigma_{\mathbf{m}}^+)\,,$$

and $|\kappa\rangle$, $\langle\kappa|$ are eigen(co)vector of the transfer matirx

$$T_{\mathbf{M}}(\zeta,\kappa) = \mathrm{Tr}_j\Big[T_{j,\mathbf{M}}(\zeta)q^{\kappa\sigma_j^3}\Big]\,.$$

We consider the expectation values

$$Z_{\mathbf{n}}\left\{q^{2\alpha S(0)}\mathcal{O}\right\} = \frac{\langle\kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\left(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\mathcal{O}\right)|\kappa\rangle}{\langle\kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\left(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\right)|\kappa\rangle},$$

where

$$T_{\mathbf{S},\mathbf{M}} = \prod_{j=-\infty}^{\curvearrowright\infty} T_{j,\mathbf{M}}(1), \quad T_{j,\mathbf{M}}(\zeta) = \prod_{\mathbf{m}=1}^{\curvearrowleft\mathbf{n}} L_{j,\mathbf{m}}(\zeta),$$

$$L_{j,\mathbf{m}}(\zeta) = q^{-\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta^2 q^{\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta(q-q^{-1})(\sigma_j^+\sigma_{\mathbf{m}}^- + \sigma_j^-\sigma_{\mathbf{m}}^+),$$

and $|\kappa\rangle$, $\langle\kappa|$ are eigen(co)vector of the transfer matirx

$$T_{\mathbf{M}}(\zeta,\kappa) = \mathrm{Tr}_j\left[T_{j,\mathbf{M}}(\zeta)q^{\kappa\sigma_j^3}\right].$$

We consider the expectation values

$$Z_{\mathbf{n}}\left\{q^{2\alpha S(0)}\mathcal{O}\right\} = \frac{\langle\kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\left(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\mathcal{O}\right)|\kappa\rangle}{\langle\kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\left(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\right)|\kappa\rangle},$$

where

$$T_{\mathbf{S},\mathbf{M}} = \prod_{j=-\infty}^{\overset{\curvearrowright}{\infty}} T_{j,\mathbf{M}}(1)\,, \quad T_{j,\mathbf{M}}(\zeta) = \prod_{\mathbf{m}=1}^{\overset{\curvearrowleft}{\mathbf{n}}} L_{j,\mathbf{m}}(\zeta)\,,$$

$$L_{j,\mathbf{m}}(\zeta) = q^{-\frac{1}{2}\sigma^3_j\sigma^3_{\mathbf{m}}} - \zeta^2 q^{\frac{1}{2}\sigma^3_j\sigma^3_{\mathbf{m}}} - \zeta(q-q^{-1})(\sigma^+_j\sigma^-_{\mathbf{m}} + \sigma^-_j\sigma^+_{\mathbf{m}})\,,$$

and $|\kappa\rangle$, $\langle\kappa|$ are eigen(co)vector of the transfer matirx

$$T_{\mathbf{M}}(\zeta,\kappa) = \mathrm{Tr}_j\left[T_{j,\mathbf{M}}(\zeta)q^{\kappa\sigma^3_j}\right].$$

We consider the expectation values

$$Z_{\mathbf{n}}\Big\{q^{2\alpha S(0)}\mathcal{O}\Big\}=\frac{\langle\kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\Big(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\mathcal{O}\Big)|\kappa\rangle}{\langle\kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\Big(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\Big)|\kappa\rangle},$$

where

$$T_{\mathbf{S},\mathbf{M}}=\prod_{j=-\infty}^{\overset{\curvearrowright}{\infty}}T_{j,\mathbf{M}}(1)\,,\quad T_{j,\mathbf{M}}(\zeta)=\prod_{\mathbf{m}=1}^{\overset{\curvearrowleft}{\mathbf{n}}}L_{j,\mathbf{m}}(\zeta)\,,$$

$$L_{j,\mathbf{m}}(\zeta)=q^{-\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3}-\zeta^2q^{\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3}-\zeta(q-q^{-1})(\sigma_j^+\sigma_{\mathbf{m}}^-+\sigma_j^-\sigma_{\mathbf{m}}^+)\,,$$

and $|\kappa\rangle$, $\langle\kappa|$ are eigen(co)vector of the transfer matirx

$$T_{\mathbf{M}}(\zeta,\kappa)=\mathrm{Tr}_j\Big[T_{j,\mathbf{M}}(\zeta)q^{\kappa\sigma_j^3}\Big]\,.$$

We consider the expectation values

$$Z_{\mathbf{n}}\left\{q^{2\alpha S(0)}\mathcal{O}\right\} = \frac{\langle\kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\left(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\mathcal{O}\right)|\kappa\rangle}{\langle\kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\left(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\right)|\kappa\rangle},$$

where

$$T_{\mathbf{S},\mathbf{M}} = \prod_{j=-\infty}^{\curvearrowright\infty} T_{j,\mathbf{M}}(1), \quad T_{j,\mathbf{M}}(\zeta) = \prod_{\mathbf{m}=1}^{\curvearrowleft\mathbf{n}} L_{j,\mathbf{m}}(\zeta),$$

$$L_{j,\mathbf{m}}(\zeta) = q^{-\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta^2 q^{\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta(q-q^{-1})(\sigma_j^+\sigma_{\mathbf{m}}^- + \sigma_j^-\sigma_{\mathbf{m}}^+),$$

and $|\kappa\rangle$, $\langle\kappa|$ are eigen(co)vector of the transfer matirx

$$T_{\mathbf{M}}(\zeta,\kappa) = \mathrm{Tr}_j\left[T_{j,\mathbf{M}}(\zeta)q^{\kappa\sigma_j^3}\right].$$

We consider the expectation values

$$Z_{\mathbf{n}}\left\{q^{2\alpha S(0)}\mathcal{O}\right\} = \frac{\langle\kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\left(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\mathcal{O}\right)|\kappa\rangle}{\langle\kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\left(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\right)|\kappa\rangle},$$

where

$$T_{\mathbf{S},\mathbf{M}} = \overset{\curvearrowright}{\prod_{j=-\infty}^{\infty}} T_{j,\mathbf{M}}(1), \quad T_{j,\mathbf{M}}(\zeta) = \overset{\curvearrowleft}{\prod_{\mathbf{m}=1}^{\mathbf{n}}} L_{j,\mathbf{m}}(\zeta),$$

$$L_{j,\mathbf{m}}(\zeta) = q^{-\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta^2 q^{\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta(q-q^{-1})(\sigma_j^+\sigma_{\mathbf{m}}^- + \sigma_j^-\sigma_{\mathbf{m}}^+),$$

and $|\kappa\rangle$, $\langle\kappa|$ are eigen(co)vector of the transfer matirx

$$T_{\mathbf{M}}(\zeta,\kappa) = \mathrm{Tr}_j\left[T_{j,\mathbf{M}}(\zeta)q^{\kappa\sigma_j^3}\right].$$

We consider the expectation values

$$Z_{\mathbf{n}}\left\{q^{2\alpha S(0)}\mathcal{O}\right\} = \frac{\langle\kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\left(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\mathcal{O}\right)|\kappa\rangle}{\langle\kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\left(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\right)|\kappa\rangle},$$

where

$$T_{\mathbf{S},\mathbf{M}} = \prod_{j=-\infty}^{\overset{\curvearrowright}{\infty}} T_{j,\mathbf{M}}(1), \quad T_{j,\mathbf{M}}(\zeta) = \prod_{\mathbf{m}=1}^{\overset{\curvearrowleft}{\mathbf{n}}} L_{j,\mathbf{m}}(\zeta),$$

$$L_{j,\mathbf{m}}(\zeta) = q^{-\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta^2 q^{\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta(q-q^{-1})(\sigma_j^+\sigma_{\mathbf{m}}^- + \sigma_j^-\sigma_{\mathbf{m}}^+),$$

and $|\kappa\rangle$, $\langle\kappa|$ are eigen(co)vector of the transfer matirx

$$T_{\mathbf{M}}(\zeta,\kappa) = \mathrm{Tr}_j\left[T_{j,\mathbf{M}}(\zeta)q^{\kappa\sigma_j^3}\right].$$

We consider the expectation values

$$Z_{\mathbf{n}}\left\{q^{2\alpha S(0)}\mathcal{O}\right\} = \frac{\langle\kappa+\alpha|\mathrm{Tr}_{\mathrm{S}}\left(T_{\mathsf{S},\mathsf{M}}q^{2\kappa S+2\alpha S(0)}\mathcal{O}\right)|\kappa\rangle}{\langle\kappa+\alpha|\mathrm{Tr}_{\mathrm{S}}\left(T_{\mathsf{S},\mathsf{M}}q^{2\kappa S+2\alpha S(0)}\right)|\kappa\rangle},$$

where

$$T_{\mathsf{S},\mathsf{M}} = \prod_{j=-\infty}^{\overset{\curvearrowright}{\infty}} T_{j,\mathsf{M}}(1), \quad T_{j,\mathsf{M}}(\zeta) = \prod_{\mathbf{m}=1}^{\overset{\curvearrowleft}{\mathbf{n}}} L_{j,\mathbf{m}}(\zeta),$$

$$L_{j,\mathbf{m}}(\zeta) = q^{-\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta^2 q^{\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta(q-q^{-1})(\sigma_j^+\sigma_{\mathbf{m}}^- + \sigma_j^-\sigma_{\mathbf{m}}^+),$$

and $|\kappa\rangle$, $\langle\kappa|$ are eigen(co)vector of the transfer matirx

$$T_{\mathsf{M}}(\zeta,\kappa) = \mathrm{Tr}_j\left[T_{j,\mathsf{M}}(\zeta)q^{\kappa\sigma_j^3}\right].$$

We consider the expectation values

$$Z_{\mathbf{n}}\Big\{q^{2\alpha S(0)}\mathcal{O}\Big\} = \frac{\langle\kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\Big(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\mathcal{O}\Big)|\kappa\rangle}{\langle\kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\Big(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\Big)|\kappa\rangle},$$

where

$$T_{\mathbf{S},\mathbf{M}} = \prod_{j=-\infty}^{\overset{\curvearrowright}{\infty}} T_{j,\mathbf{M}}(1), \quad T_{j,\mathbf{M}}(\zeta) = \prod_{\mathbf{m}=1}^{\overset{\curvearrowleft}{\mathbf{n}}} L_{j,\mathbf{m}}(\zeta),$$

$$L_{j,\mathbf{m}}(\zeta) = q^{-\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta^2 q^{\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta(q-q^{-1})(\sigma_j^+\sigma_{\mathbf{m}}^- + \sigma_j^-\sigma_{\mathbf{m}}^+).$$

and $|\kappa\rangle$, $\langle\kappa|$ are eigen(co)vector of the transfer matirx

$$T_{\mathbf{M}}(\zeta,\kappa) = \mathrm{Tr}_j\Big[T_{j,\mathbf{M}}(\zeta)q^{\kappa\sigma_j^3}\Big].$$

We consider the expectation values

$$Z_{\mathbf{n}}\Big\{q^{2\alpha S(0)}\mathcal{O}\Big\} = \frac{\langle \kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\Big(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\mathcal{O}\Big)|\kappa\rangle}{\langle \kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\Big(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\Big)|\kappa\rangle},$$

where

$$T_{\mathbf{S},\mathbf{M}} = \prod_{j=-\infty}^{\overset{\curvearrowright}{\infty}} T_{j,\mathbf{M}}(1)\,, \quad T_{j,\mathbf{M}}(\zeta) = \prod_{\mathbf{m}=1}^{\overset{\curvearrowleft}{\mathbf{n}}} L_{j,\mathbf{m}}(\zeta)\,,$$

$$L_{j,\mathbf{m}}(\zeta) = q^{-\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta^2 q^{\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta(q-q^{-1})(\sigma_j^+\sigma_{\mathbf{m}}^- + \sigma_j^-\sigma_{\mathbf{m}}^+)\,,$$

and $|\kappa\rangle$, $\langle\kappa|$ are eigen(co)vector of the transfer matirx

$$T_{\mathbf{M}}(\zeta,\kappa) = \mathrm{Tr}_j\Big[T_{j,\mathbf{M}}(\zeta)q^{\kappa\sigma_j^3}\Big]\,.$$

We consider the expectation values

$$Z_{\mathbf{n}}\left\{q^{2\alpha S(0)}\mathcal{O}\right\} = \frac{\langle\kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\left(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\mathcal{O}\right)|\kappa\rangle}{\langle\kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\left(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\right)|\kappa\rangle},$$

where

$$T_{\mathbf{S},\mathbf{M}} = \prod_{j=-\infty}^{\overset{\curvearrowright}{\infty}} T_{j,\mathbf{M}}(1)\,, \quad T_{j,\mathbf{M}}(\zeta) = \prod_{\mathbf{m}=1}^{\overset{\curvearrowleft}{\mathbf{n}}} L_{j,\mathbf{m}}(\zeta)\,,$$

$$L_{j,\mathbf{m}}(\zeta) = q^{-\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta^2 q^{\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta(q-q^{-1})(\sigma_j^+\sigma_{\mathbf{m}}^- + \sigma_j^-\sigma_{\mathbf{m}}^+)\,,$$

and $|\kappa\rangle$, $\langle\kappa|$ are eigen(co)vector of the transfer matirx

$$T_{\mathbf{M}}(\zeta,\kappa) = \mathrm{Tr}_j\left[T_{j,\mathbf{M}}(\zeta)q^{\kappa\sigma_j^3}\right].$$

We consider the expectation values

$$Z_{\mathbf{n}}\left\{q^{2\alpha S(0)}\mathcal{O}\right\} = \frac{\langle\kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\left(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\mathcal{O}\right)|\kappa\rangle}{\langle\kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\left(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\right)|\kappa\rangle},$$

where

$$T_{\mathbf{S},\mathbf{M}} = \prod_{j=-\infty}^{\overset{\curvearrowright}{\infty}} T_{j,\mathbf{M}}(1), \quad T_{j,\mathbf{M}}(\zeta) = \prod_{\mathbf{m}=1}^{\overset{\curvearrowleft}{\mathbf{n}}} L_{j,\mathbf{m}}(\zeta),$$

$$L_{j,\mathbf{m}}(\zeta) = q^{-\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta^2 q^{\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta(q-q^{-1})(\sigma_j^+\sigma_{\mathbf{m}}^- + \sigma_j^-\sigma_{\mathbf{m}}^+),$$

and $|\kappa\rangle$, $\langle\kappa|$ are eigen(co)vector of the transfer matirx

$$T_{\mathbf{M}}(\zeta,\kappa) = \mathrm{Tr}_j\left[T_{j,\mathbf{M}}(\zeta)q^{\kappa\sigma_j^3}\right].$$

We consider the expectation values

$$Z_{\mathbf{n}}\left\{q^{2\alpha S(0)}\mathcal{O}\right\} = \frac{\langle\kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\left(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\mathcal{O}\right)|\kappa\rangle}{\langle\kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\left(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\right)|\kappa\rangle},$$

where

$$T_{\mathbf{S},\mathbf{M}} = \overset{\curvearrowright}{\prod_{j=-\infty}^{\infty}} T_{j,\mathbf{M}}(1), \quad T_{j,\mathbf{M}}(\zeta) = \overset{\curvearrowleft}{\prod_{\mathbf{m}=1}^{\mathbf{n}}} L_{j,\mathbf{m}}(\zeta),$$

$$L_{j,\mathbf{m}}(\zeta) = q^{-\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta^2 q^{\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta(q-q^{-1})(\sigma_j^+\sigma_{\mathbf{m}}^- + \sigma_j^-\sigma_{\mathbf{m}}^+),$$

and $|\kappa\rangle$, $\langle\kappa|$ are eigen(co)vector of the transfer matirx

$$T_{\mathbf{M}}(\zeta,\kappa) = \mathrm{Tr}_j\left[T_{j,\mathbf{M}}(\zeta)q^{\kappa\sigma_j^3}\right].$$

We consider the expectation values

$$Z_{\mathbf{n}}\left\{q^{2\alpha S(0)}\mathcal{O}\right\} = \frac{\langle\kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\left(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\mathcal{O}\right)|\kappa\rangle}{\langle\kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\left(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\right)|\kappa\rangle},$$

where

$$T_{\mathbf{S},\mathbf{M}} = \prod_{j=-\infty}^{\overset{\curvearrowright}{\infty}} T_{j,\mathbf{M}}(1), \quad T_{j,\mathbf{M}}(\zeta) = \prod_{\mathbf{m}=1}^{\overset{\curvearrowleft}{\mathbf{n}}} L_{j,\mathbf{m}}(\zeta),$$

$$L_{j,\mathbf{m}}(\zeta) = q^{-\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta^2 q^{\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta(q-q^{-1})(\sigma_j^+\sigma_{\mathbf{m}}^- + \sigma_j^-\sigma_{\mathbf{m}}^+),$$

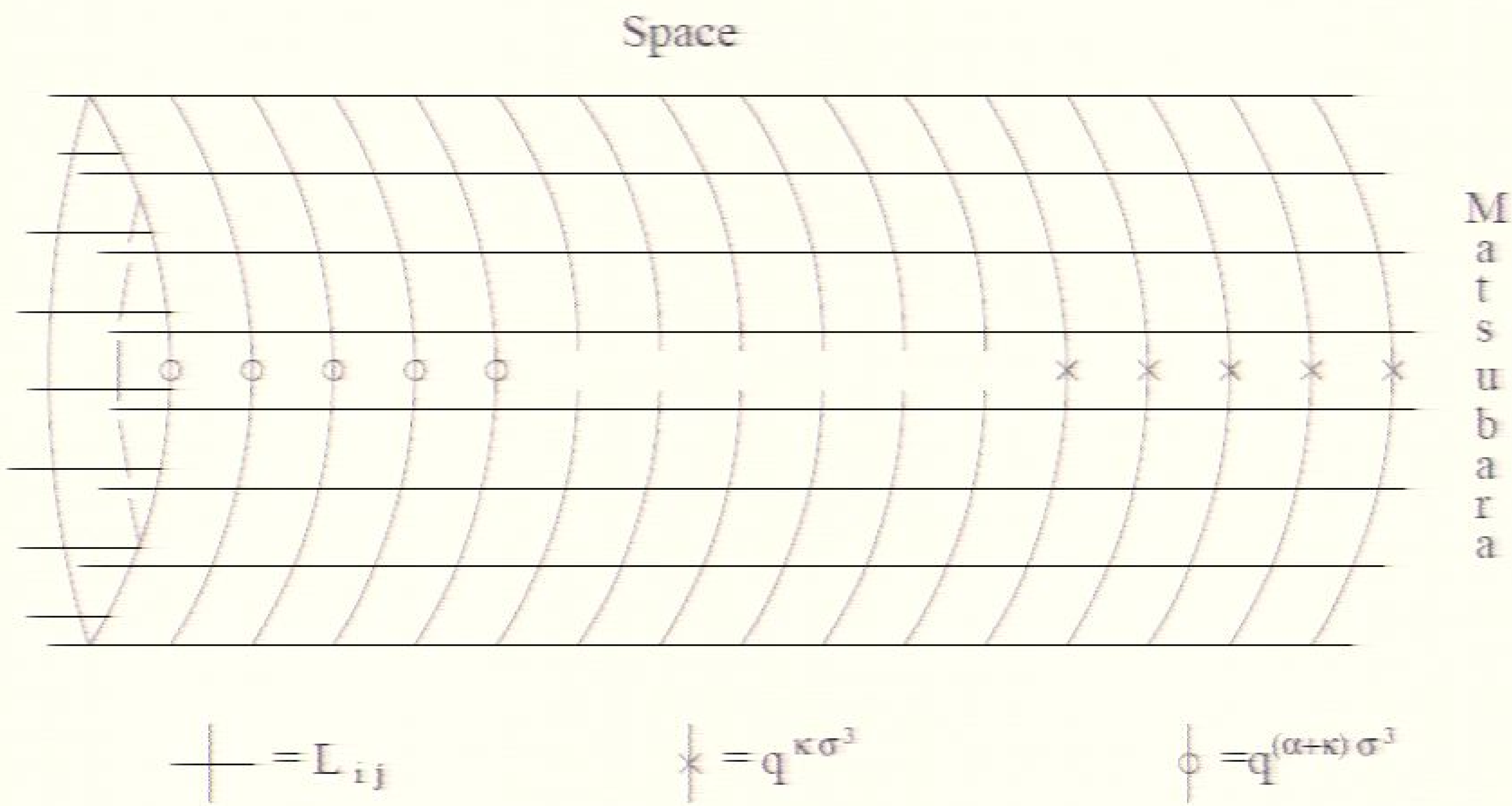
and $|\kappa\rangle$, $\langle\kappa|$ are eigen(co)vector of the transfer matirx

$$T_{\mathbf{M}}(\zeta,\kappa) = \mathrm{Tr}_j\left[T_{j,\mathbf{M}}(\zeta)q^{\kappa\sigma_j^3}\right].$$

We consider the expectation values

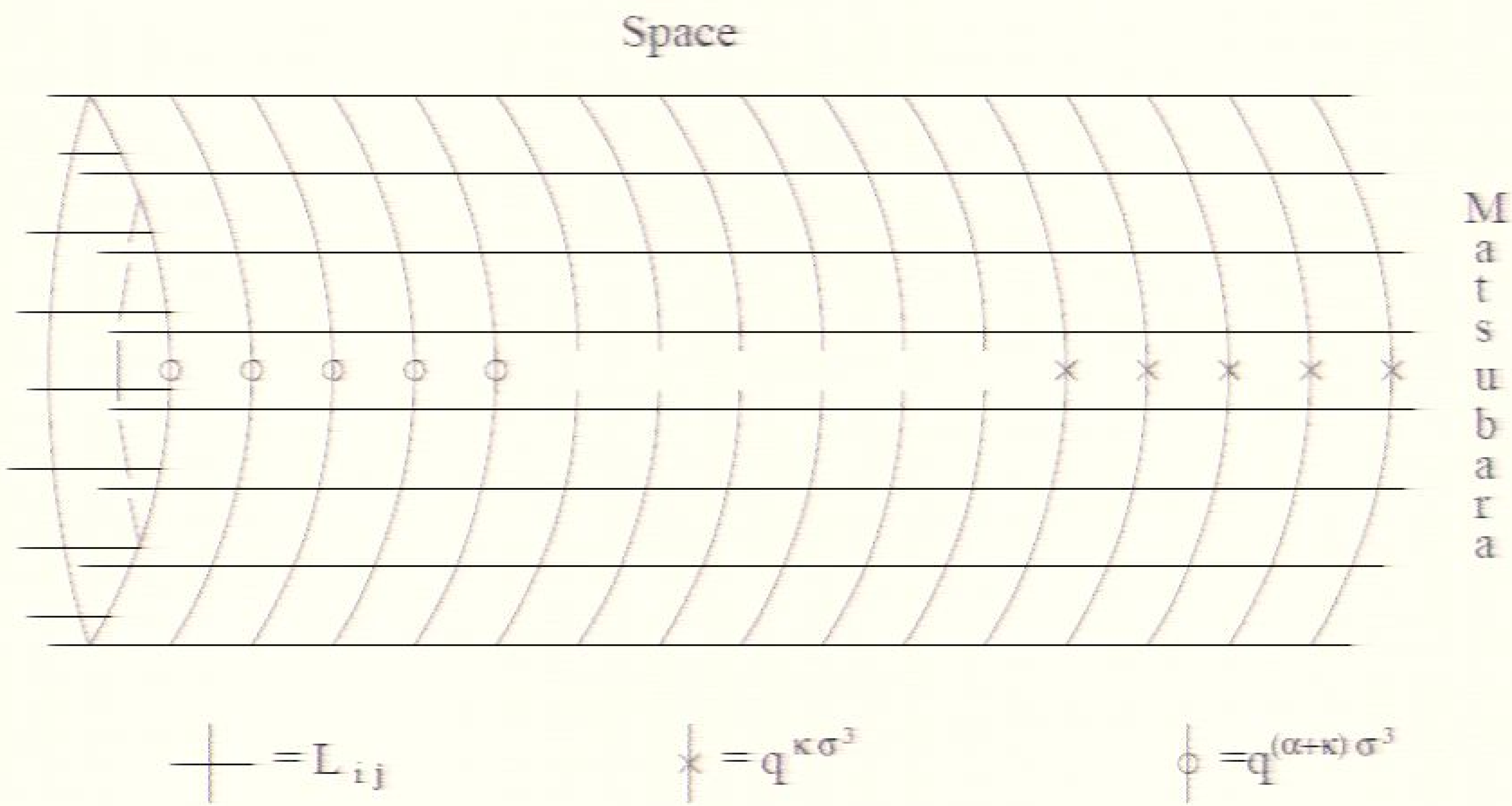
Fermionic basis on the lattice

We consider a 6 vertex model on a cylinder



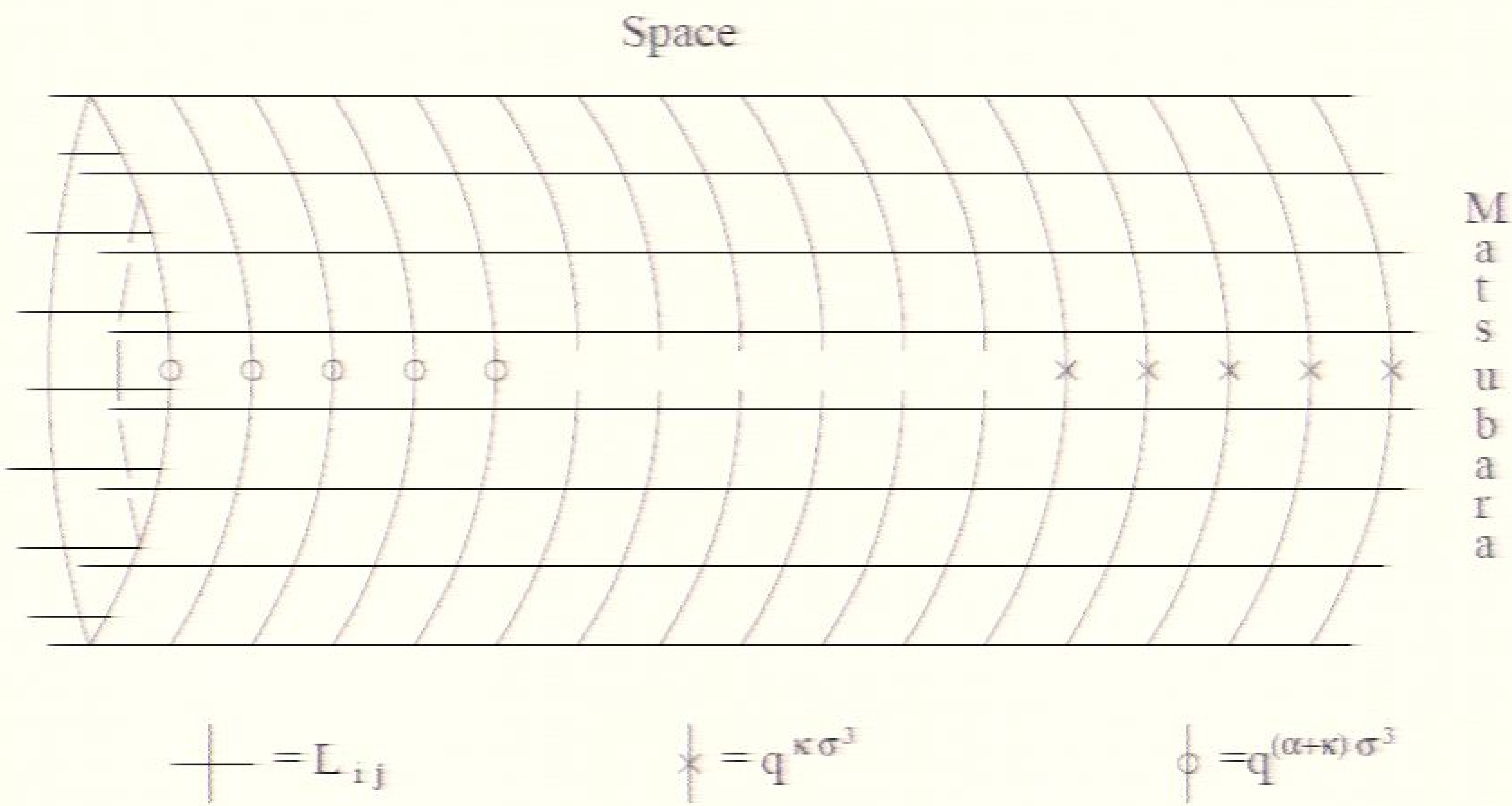
Fermionic basis on the lattice

We consider a 6 vertex model on a cylinder



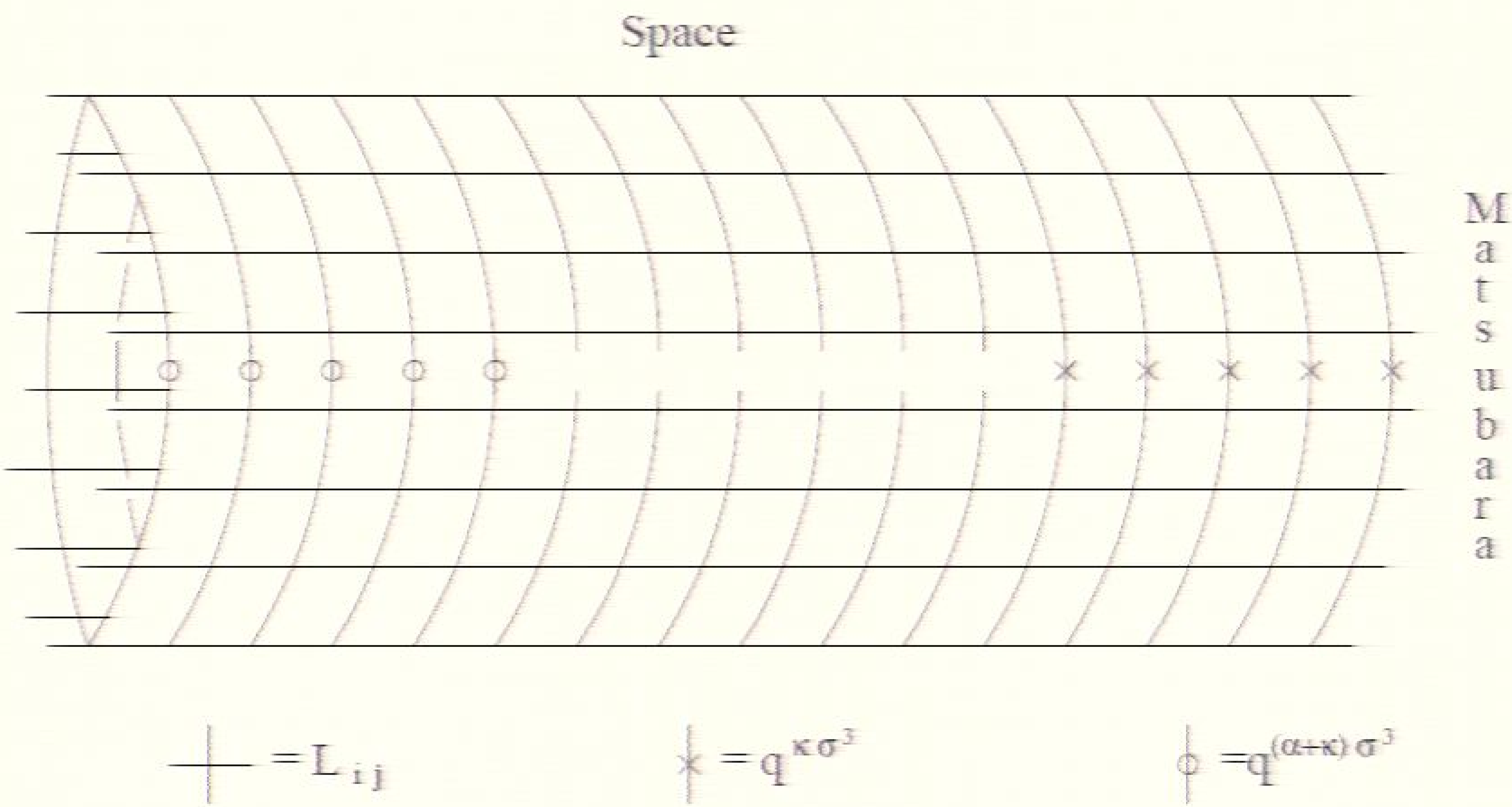
Fermionic basis on the lattice

We consider a 6 vertex model on a cylinder



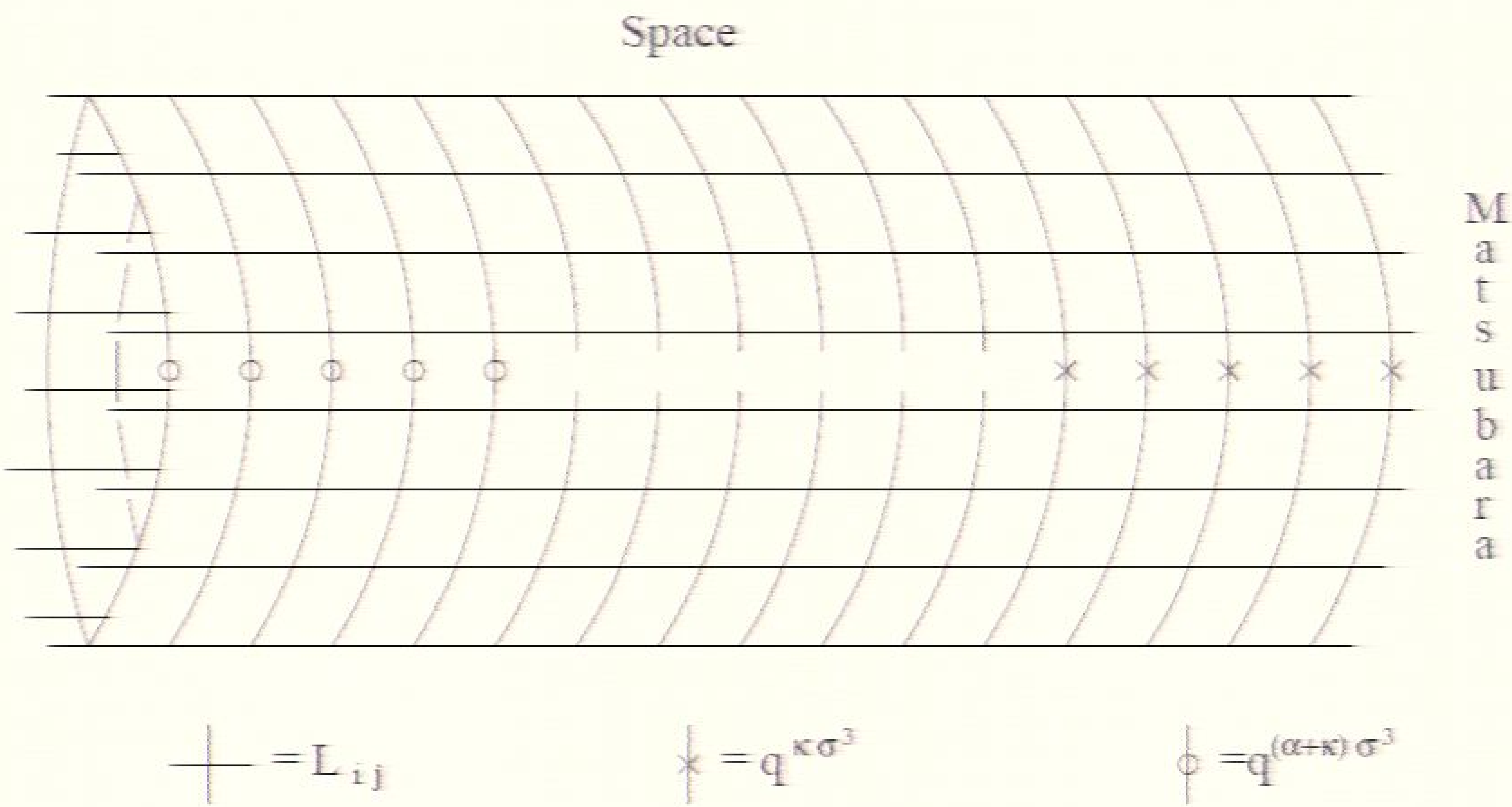
Fermionic basis on the lattice

We consider a 6 vertex model on a cylinder



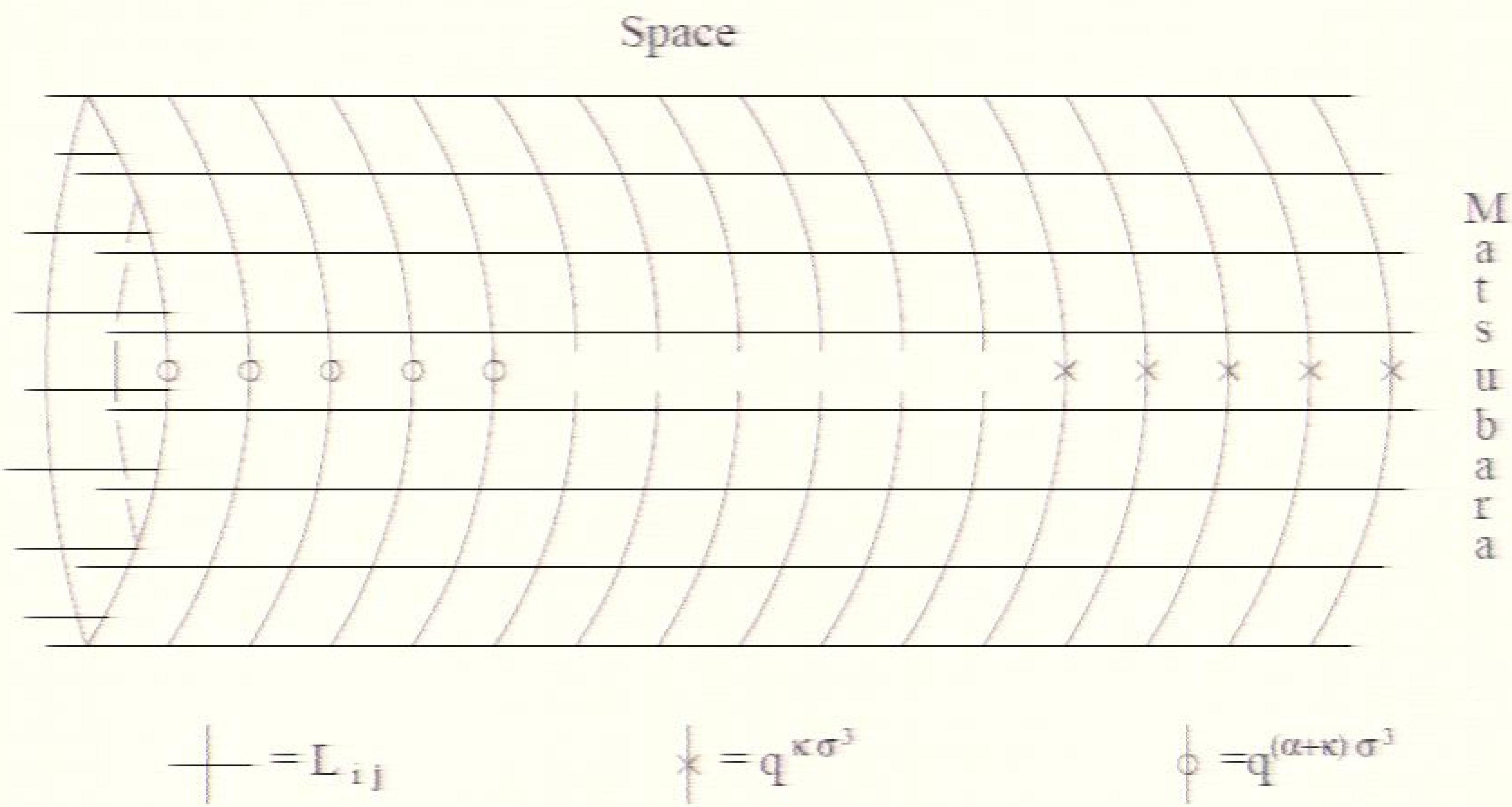
Fermionic basis on the lattice

We consider a 6 vertex model on a cylinder



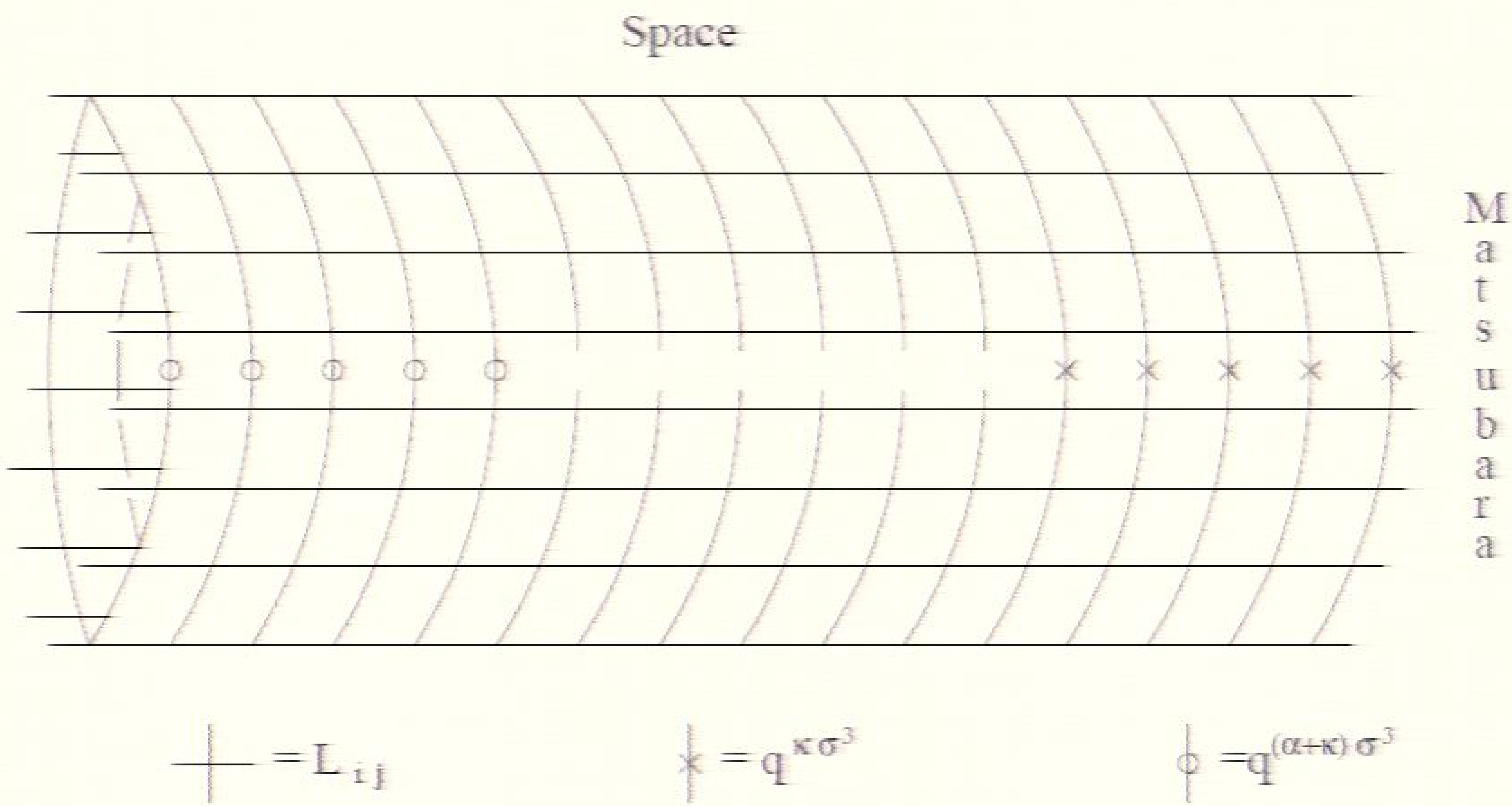
Fermionic basis on the lattice

We consider a 6 vertex model on a cylinder



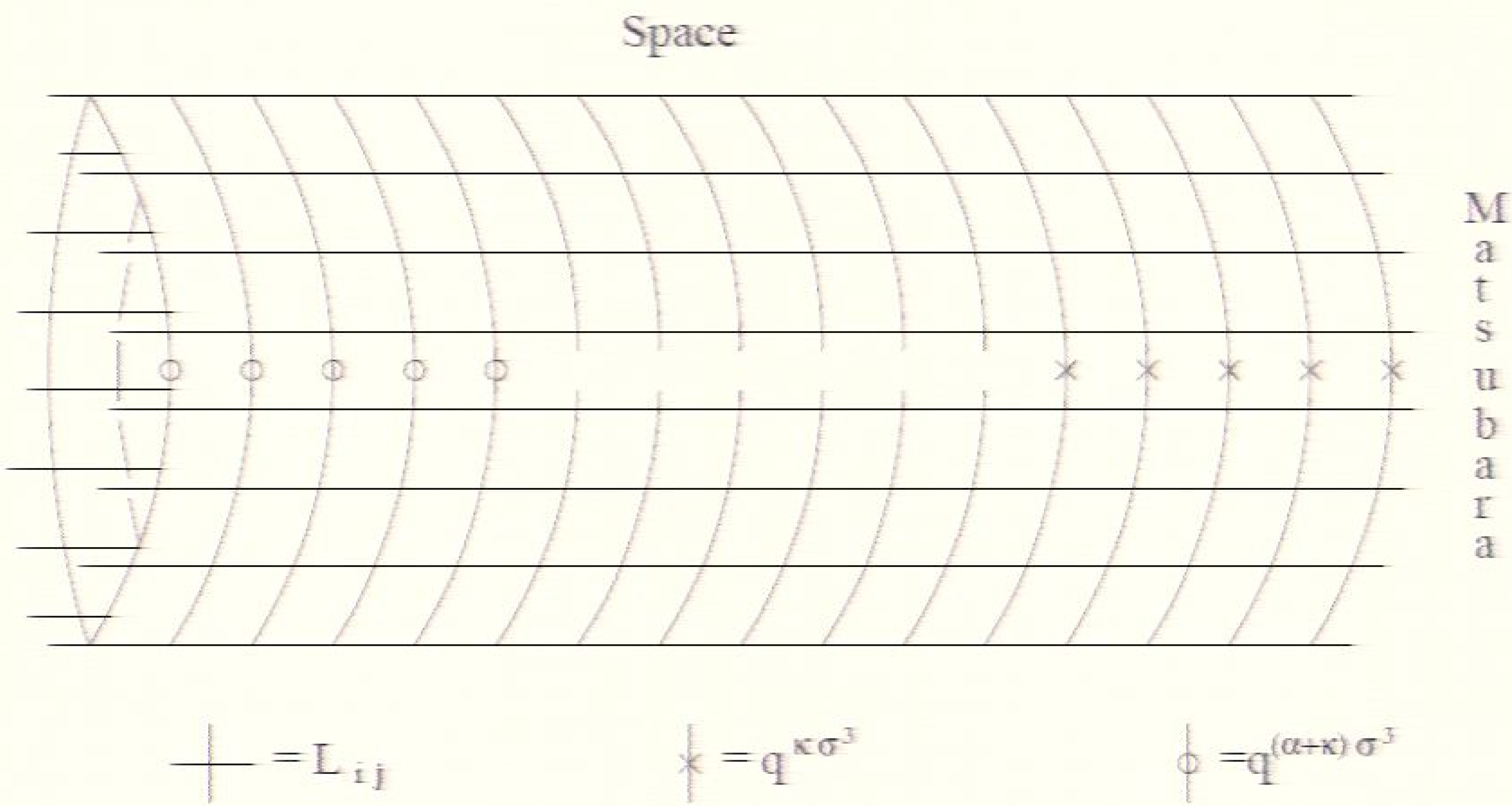
Fermionic basis on the lattice

We consider a 6 vertex model on a cylinder



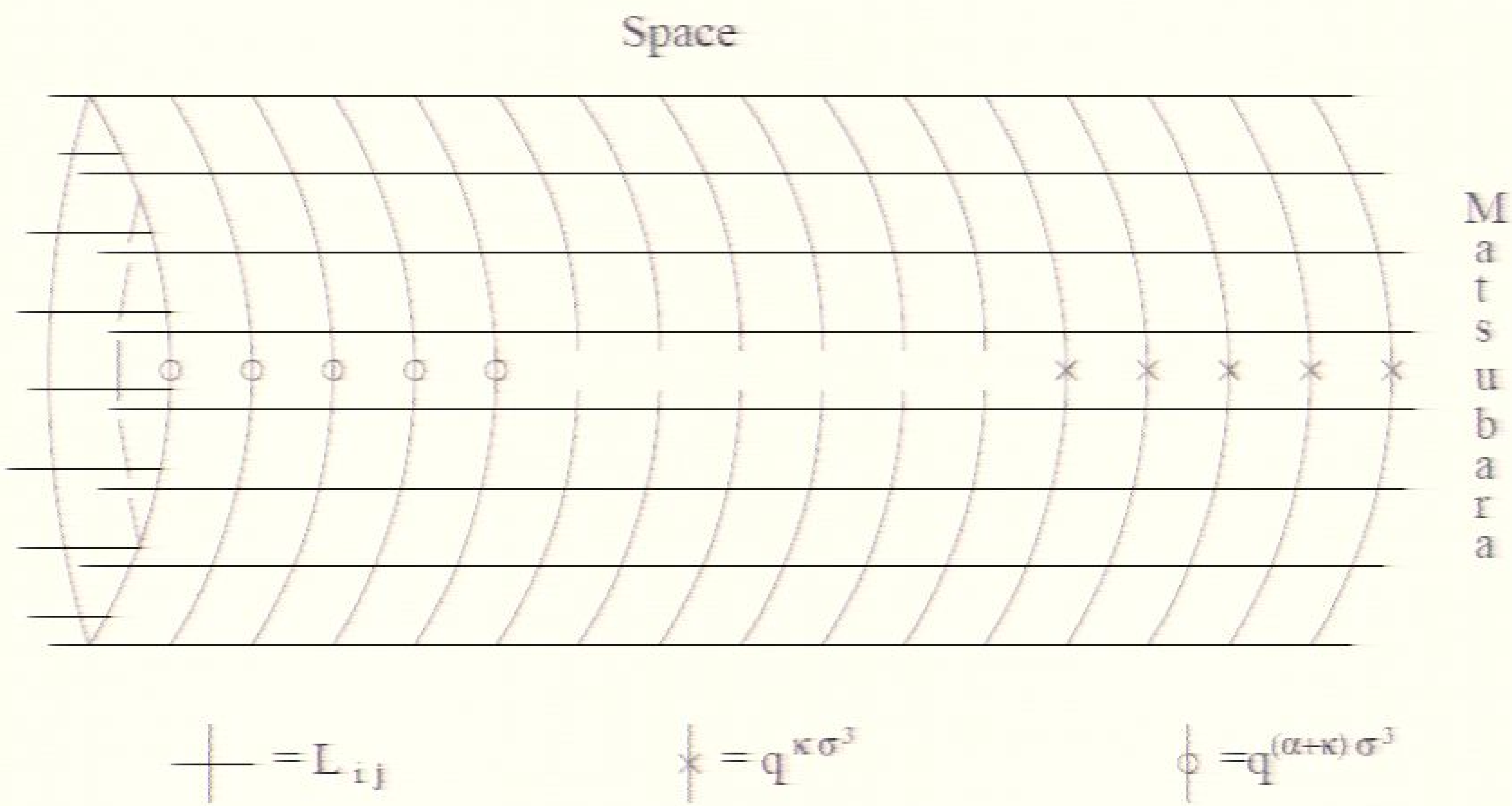
Fermionic basis on the lattice

We consider a 6 vertex model on a cylinder



Fermionic basis on the lattice

We consider a 6 vertex model on a cylinder



We consider the expectation values

We consider the expectation values

$$Z_{\mathbf{n}}\left\{q^{2\alpha S(0)}\mathcal{O}\right\} = \frac{\langle \kappa+\alpha|\mathrm{Tr}_S\Big(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\mathcal{O}\Big)|\kappa\rangle}{\langle \kappa+\alpha|\mathrm{Tr}_S\Big(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\Big)|\kappa\rangle}.$$

We consider the expectation values

$$Z_{\mathbf{n}}\left\{q^{2\alpha S(0)}\mathcal{O}\right\} = \frac{\langle \kappa+\alpha|\mathrm{Tr}_{\mathrm{S}}\left(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\mathcal{O}\right)|\kappa\rangle}{\langle \kappa+\alpha|\mathrm{Tr}_{\mathrm{S}}\left(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\right)|\kappa\rangle},$$

We consider the expectation values

$$Z_{\mathbf{n}}\Big\{q^{2\alpha S(0)}\mathcal{O}\Big\} = \frac{\langle\kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\Big(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\mathcal{O}\Big)|\kappa\rangle}{\langle\kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\Big(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\Big)|\kappa\rangle},$$

We consider the expectation values

$$Z_{\mathbf{n}}\left\{q^{2\alpha S(0)}\mathcal{O}\right\} = \frac{\langle\kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\left(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\mathcal{O}\right)|\kappa\rangle}{\langle\kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\left(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\right)|\kappa\rangle},$$

where

$$T_{\mathbf{S},\mathbf{M}} = \overset{\curvearrowright}{\prod_{j=-\infty}^{\infty}} T_{j,\mathbf{M}}(1), \quad T_{j,\mathbf{M}}(\zeta) = \overset{\curvearrowleft}{\prod_{\mathbf{m}=1}^{\mathbf{n}}} L_{j,\mathbf{m}}(\zeta),$$

$$L_{j,\mathbf{m}}(\zeta) = q^{-\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta^2 q^{\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta(q-q^{-1})(\sigma_j^+\sigma_{\mathbf{m}}^- + \sigma_j^-\sigma_{\mathbf{m}}^+),$$

and $|\kappa\rangle$, $\langle\kappa|$ are eigen(co)vector of the transfer matirx

$$T_{\mathbf{M}}(\zeta,\kappa) = \mathrm{Tr}_j\left[T_{j,\mathbf{M}}(\zeta)q^{\kappa\sigma_j^3}\right].$$

We consider the expectation values

$$Z_{\mathbf{n}}\left\{q^{2\alpha S(0)}\mathcal{O}\right\} = \frac{\langle\kappa+\alpha|\mathrm{Tr}_{\mathrm{S}}\left(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\mathcal{O}\right)|\kappa\rangle}{\langle\kappa+\alpha|\mathrm{Tr}_{\mathrm{S}}\left(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\right)|\kappa\rangle},$$

where

$$T_{\mathbf{S},\mathbf{M}} = \overset{\curvearrowright}{\prod_{j=-\infty}^{\infty}} T_{j,\mathbf{M}}(1), \quad T_{j,\mathbf{M}}(\zeta) = \overset{\curvearrowleft}{\prod_{\mathbf{m}=1}^{\mathbf{n}}} L_{j,\mathbf{m}}(\zeta),$$

$$L_{j,\mathbf{m}}(\zeta) = q^{-\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta^2 q^{\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta(q-q^{-1})(\sigma_j^+\sigma_{\mathbf{m}}^- + \sigma_j^-\sigma_{\mathbf{m}}^+).$$

and $|\kappa\rangle$, $\langle\kappa|$ are eigen(co)vector of the transfer matirx

$$T_{\mathbf{M}}(\zeta,\kappa) = \mathrm{Tr}_j\left[T_{j,\mathbf{M}}(\zeta)q^{\kappa\sigma_j^3}\right].$$

We consider the expectation values

$$Z_{\mathbf{n}}\left\{q^{2\alpha S(0)}\mathcal{O}\right\} = \frac{\langle\kappa+\alpha|\mathrm{Tr}_{\mathrm{S}}\Big(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\mathcal{O}\Big)|\kappa\rangle}{\langle\kappa+\alpha|\mathrm{Tr}_{\mathrm{S}}\Big(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\Big)|\kappa\rangle},$$

where

$$T_{\mathbf{S},\mathbf{M}} = \prod_{j=-\infty}^{\overset{\curvearrowright}{\infty}} T_{j,\mathbf{M}}(1)\,, \quad T_{j,\mathbf{M}}(\zeta) = \prod_{\mathbf{m}=1}^{\overset{\curvearrowleft}{\mathbf{n}}} L_{j,\mathbf{m}}(\zeta)\,,$$

$$L_{j,\mathbf{m}}(\zeta) = q^{-\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta^2 q^{\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta(q-q^{-1})(\sigma_j^+\sigma_{\mathbf{m}}^- + \sigma_j^-\sigma_{\mathbf{m}}^+)\,,$$

and $|\kappa\rangle$, $\langle\kappa|$ are eigen(co)vector of the transfer matirx

$$T_{\mathbf{M}}(\zeta,\kappa) = \mathrm{Tr}_j\Big[T_{j,\mathbf{M}}(\zeta)q^{\kappa\sigma_j^3}\Big]\,.$$

We consider the expectation values

$$Z_{\mathbf{n}}\left\{q^{2\alpha S(0)}\mathcal{O}\right\} = \frac{\langle \kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\left(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\mathcal{O}\right)|\kappa\rangle}{\langle \kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\left(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\right)|\kappa\rangle},$$

where

$$T_{\mathbf{S},\mathbf{M}} = \prod_{j=-\infty}^{\curvearrowright \infty} T_{j,\mathbf{M}}(1), \quad T_{j,\mathbf{M}}(\zeta) = \prod_{\mathbf{m}=1}^{\curvearrowleft \mathbf{n}} L_{j,\mathbf{m}}(\zeta).$$

$$L_{j,\mathbf{m}}(\zeta) = q^{-\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta^2 q^{\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta(q-q^{-1})(\sigma_j^+\sigma_{\mathbf{m}}^- + \sigma_j^-\sigma_{\mathbf{m}}^+).$$

and $|\kappa\rangle$, $\langle\kappa|$ are eigen(co)vector of the transfer matirx

$$T_{\mathbf{M}}(\zeta,\kappa) = \mathrm{Tr}_j\left[T_{j,\mathbf{M}}(\zeta)q^{\kappa\sigma_j^3}\right].$$

We consider the expectation values

$$Z_{\mathbf{n}}\Big\{q^{2\alpha S(0)}\mathcal{O}\Big\} = \frac{\langle\kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\Big(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\mathcal{O}\Big)|\kappa\rangle}{\langle\kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\Big(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\Big)|\kappa\rangle}\,.$$

where

$$T_{\mathbf{S},\mathbf{M}} = \prod_{j=-\infty}^{\overset{\curvearrowright}{\infty}} T_{j,\mathbf{M}}(1)\,, \quad T_{j,\mathbf{M}}(\zeta) = \prod_{\mathbf{m}=1}^{\overset{\curvearrowleft}{\mathbf{n}}} L_{j,\mathbf{m}}(\zeta)\,,$$

$$L_{j,\mathbf{m}}(\zeta) = q^{-\frac{1}{2}\sigma^3_j\sigma^3_{\mathbf{m}}} - \zeta^2 q^{\frac{1}{2}\sigma^3_j\sigma^3_{\mathbf{m}}} - \zeta(q-q^{-1})(\sigma^+_j\sigma^-_{\mathbf{m}} + \sigma^-_j\sigma^+_{\mathbf{m}})\,,$$

and $|\kappa\rangle$, $\langle\kappa|$ are eigen(co)vector of the transfer matirx

$$T_{\mathbf{M}}(\zeta,\kappa) = \mathrm{Tr}_j\Big[T_{j,\mathbf{M}}(\zeta)q^{\kappa\sigma^3_j}\Big]\,.$$

We consider the expectation values

$$Z_{\mathbf{n}}\left\{q^{2\alpha S(0)}\mathcal{O}\right\} = \frac{\langle\kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\left(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\mathcal{O}\right)|\kappa\rangle}{\langle\kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\left(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\right)|\kappa\rangle},$$

where

$$T_{\mathbf{S},\mathbf{M}} = \prod_{j=-\infty}^{\overset{\curvearrowright}{\infty}} T_{j,\mathbf{M}}(1), \quad T_{j,\mathbf{M}}(\zeta) = \prod_{\mathbf{m}=1}^{\overset{\curvearrowleft}{\mathbf{n}}} L_{j,\mathbf{m}}(\zeta),$$

$$L_{j,\mathbf{m}}(\zeta) = q^{-\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta^2 q^{\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta(q-q^{-1})(\sigma_j^+\sigma_{\mathbf{m}}^- + \sigma_j^-\sigma_{\mathbf{m}}^+),$$

and $|\kappa\rangle$, $\langle\kappa|$ are eigen(co)vector of the transfer matirx

$$T_{\mathbf{M}}(\zeta,\kappa) = \mathrm{Tr}_j\left[T_{j,\mathbf{M}}(\zeta)q^{\kappa\sigma_j^3}\right].$$

We consider the expectation values

$$Z_{\mathbf{n}}\Big\{q^{2\alpha S(0)}\mathcal{O}\Big\} = \frac{\langle\kappa+\alpha|\mathrm{Tr}_{\mathrm{S}}\Big(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\mathcal{O}\Big)|\kappa\rangle}{\langle\kappa+\alpha|\mathrm{Tr}_{\mathrm{S}}\Big(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\Big)|\kappa\rangle},$$

where

$$T_{\mathbf{S},\mathbf{M}} = \prod_{j=-\infty}^{\curvearrowright\infty} T_{j,\mathbf{M}}(1), \quad T_{j,\mathbf{M}}(\zeta) = \prod_{\mathbf{m}=1}^{\curvearrowleft\mathbf{n}} L_{j,\mathbf{m}}(\zeta),$$

$$L_{j,\mathbf{m}}(\zeta) = q^{-\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta^2 q^{\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta(q-q^{-1})(\sigma_j^+\sigma_{\mathbf{m}}^- + \sigma_j^-\sigma_{\mathbf{m}}^+),$$

and $|\kappa\rangle$, $\langle\kappa|$ are eigen(co)vector of the transfer matirx

$$T_{\mathbf{M}}(\zeta,\kappa) = \mathrm{Tr}_j\Big[T_{j,\mathbf{M}}(\zeta)q^{\kappa\sigma_j^3}\Big].$$

We consider the expectation values

$$Z_{\mathbf{n}}\Big\{q^{2\alpha S(0)}\mathcal{O}\Big\} = \frac{\langle\kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\Big(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\mathcal{O}\Big)|\kappa\rangle}{\langle\kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\Big(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\Big)|\kappa\rangle},$$

where

$$T_{\mathbf{S},\mathbf{M}} = \overset{\curvearrowright}{\prod_{j=-\infty}^{\infty}} T_{j,\mathbf{M}}(1), \quad T_{j,\mathbf{M}}(\zeta) = \overset{\curvearrowleft}{\prod_{\mathbf{m}=1}^{\mathbf{n}}} L_{j,\mathbf{m}}(\zeta),$$

$$L_{j,\mathbf{m}}(\zeta) = q^{-\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta^2 q^{\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta(q-q^{-1})(\sigma_j^+\sigma_{\mathbf{m}}^- + \sigma_j^-\sigma_{\mathbf{m}}^+),$$

and $|\kappa\rangle$, $\langle\kappa|$ are eigen(co)vector of the transfer matirx

$$T_{\mathbf{M}}(\zeta,\kappa) = \mathrm{Tr}_j\Big[T_{j,\mathbf{M}}(\zeta)q^{\kappa\sigma_j^3}\Big].$$

We consider the expectation values

$$Z_{\mathbf{n}}\left\{q^{2\alpha S(0)}\mathcal{O}\right\} = \frac{\langle\kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\left(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\mathcal{O}\right)|\kappa\rangle}{\langle\kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\left(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\right)|\kappa\rangle},$$

where

$$T_{\mathbf{S},\mathbf{M}} = \prod_{j=-\infty}^{\overset{\curvearrowright}{\infty}} T_{j,\mathbf{M}}(1), \quad T_{j,\mathbf{M}}(\zeta) = \prod_{\mathbf{m}=1}^{\overset{\curvearrowleft}{\mathbf{n}}} L_{j,\mathbf{m}}(\zeta),$$

$$L_{j,\mathbf{m}}(\zeta) = q^{-\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta^2 q^{\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta(q-q^{-1})(\sigma_j^+\sigma_{\mathbf{m}}^- + \sigma_j^-\sigma_{\mathbf{m}}^+),$$

and $|\kappa\rangle$, $\langle\kappa|$ are eigen(co)vector of the transfer matirx

$$T_{\mathbf{M}}(\zeta,\kappa) = \mathrm{Tr}_j\left[T_{j,\mathbf{M}}(\zeta)q^{\kappa\sigma_j^3}\right].$$

We consider the expectation values

$$Z_{\mathbf{n}}\Big\{q^{2\alpha S(0)}\mathcal{O}\Big\} = \frac{\langle\kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\Big(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\mathcal{O}\Big)|\kappa\rangle}{\langle\kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\Big(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\Big)|\kappa\rangle},$$

where

$$T_{\mathbf{S},\mathbf{M}} = \prod_{j=-\infty}^{\overset{\curvearrowright}{\infty}} T_{j,\mathbf{M}}(1)\,, \quad T_{j,\mathbf{M}}(\zeta) = \prod_{\mathbf{m}=1}^{\overset{\curvearrowleft}{\mathbf{n}}} L_{j,\mathbf{m}}(\zeta)\,,$$

$$L_{j,\mathbf{m}}(\zeta) = q^{-\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta^2 q^{\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta(q-q^{-1})(\sigma_j^+\sigma_{\mathbf{m}}^- + \sigma_j^-\sigma_{\mathbf{m}}^+)\,,$$

and $|\kappa\rangle$, $\langle\kappa|$ are eigen(co)vector of the transfer matirx

$$T_{\mathbf{M}}(\zeta,\kappa) = \mathrm{Tr}_j\Big[T_{j,\mathbf{M}}(\zeta)q^{\kappa\sigma_j^3}\Big]\,.$$

We consider the expectation values

$$Z_{\mathbf{n}}\Big\{q^{2\alpha S(0)}\mathcal{O}\Big\} = \frac{\langle\kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\Big(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\mathcal{O}\Big)|\kappa\rangle}{\langle\kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\Big(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\Big)|\kappa\rangle},$$

where

$$T_{\mathbf{S},\mathbf{M}} = \prod_{j=-\infty}^{\overset{\curvearrowright}{\infty}} T_{j,\mathbf{M}}(1), \quad T_{j,\mathbf{M}}(\zeta) = \prod_{\mathbf{m}=1}^{\overset{\curvearrowleft}{\mathbf{n}}} L_{j,\mathbf{m}}(\zeta),$$

$$L_{j,\mathbf{m}}(\zeta) = q^{-\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta^2 q^{\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta(q-q^{-1})(\sigma_j^+\sigma_{\mathbf{m}}^- + \sigma_j^-\sigma_{\mathbf{m}}^+),$$

and $|\kappa\rangle$, $\langle\kappa|$ are eigen(co)vector of the transfer matirx

$$T_{\mathbf{M}}(\zeta,\kappa) = \mathrm{Tr}_j\Big[T_{j,\mathbf{M}}(\zeta)q^{\kappa\sigma_j^3}\Big].$$

We consider the expectation values

$$Z_{\mathbf{n}}\left\{q^{2\alpha S(0)}\mathcal{O}\right\} = \frac{\langle\kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\left(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\mathcal{O}\right)|\kappa\rangle}{\langle\kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\left(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\right)|\kappa\rangle},$$

where

$$T_{\mathbf{S},\mathbf{M}} = \prod_{j=-\infty}^{\overset{\curvearrowright}{\infty}} T_{j,\mathbf{M}}(1)\,, \quad T_{j,\mathbf{M}}(\zeta) = \prod_{\mathbf{m}=1}^{\overset{\curvearrowleft}{\mathbf{n}}} L_{j,\mathbf{m}}(\zeta)\,,$$

$$L_{j,\mathbf{m}}(\zeta) = q^{-\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta^2 q^{\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta(q-q^{-1})(\sigma_j^+\sigma_{\mathbf{m}}^- + \sigma_j^-\sigma_{\mathbf{m}}^+)\,.$$

and $|\kappa\rangle$, $\langle\kappa|$ are eigen(co)vector of the transfer matirx

$$T_{\mathbf{M}}(\zeta,\kappa) = \mathrm{Tr}_j\left[T_{j,\mathbf{M}}(\zeta)q^{\kappa\sigma_j^3}\right].$$

We consider the expectation values

$$Z_{\mathbf{n}}\left\{q^{2\alpha S(0)}\mathcal{O}\right\} = \frac{\langle\kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\left(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\mathcal{O}\right)|\kappa\rangle}{\langle\kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\left(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\right)|\kappa\rangle},$$

where

$$T_{\mathbf{S},\mathbf{M}} = \prod_{j=-\infty}^{\overset{\curvearrowright}{\infty}} T_{j,\mathbf{M}}(1), \quad T_{j,\mathbf{M}}(\zeta) = \prod_{\mathbf{m}=1}^{\overset{\curvearrowleft}{\mathbf{n}}} L_{j,\mathbf{m}}(\zeta),$$

$$L_{j,\mathbf{m}}(\zeta) = q^{-\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta^2 q^{\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta(q-q^{-1})(\sigma_j^+\sigma_{\mathbf{m}}^- + \sigma_j^-\sigma_{\mathbf{m}}^+),$$

and $|\kappa\rangle$, $\langle\kappa|$ are eigen(co)vector of the transfer matirx

$$T_{\mathbf{M}}(\zeta,\kappa) = \mathrm{Tr}_j\left[T_{j,\mathbf{M}}(\zeta)q^{\kappa\sigma_j^3}\right].$$

We consider the expectation values

$$Z_{\mathbf{n}}\Big\{q^{2\alpha S(0)}\mathcal{O}\Big\} = \frac{\langle \kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\Big(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\mathcal{O}\Big)|\kappa\rangle}{\langle \kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\Big(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\Big)|\kappa\rangle},$$

where

$$T_{\mathbf{S},\mathbf{M}} = \prod_{j=-\infty}^{\overset{\curvearrowright}{\infty}} T_{j,\mathbf{M}}(1), \quad T_{j,\mathbf{M}}(\zeta) = \prod_{\mathbf{m}=1}^{\overset{\curvearrowleft}{\mathbf{n}}} L_{j,\mathbf{m}}(\zeta),$$

$$L_{j,\mathbf{m}}(\zeta) = q^{-\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta^2 q^{\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta(q-q^{-1})(\sigma_j^+\sigma_{\mathbf{m}}^- + \sigma_j^-\sigma_{\mathbf{m}}^+),$$

and $|\kappa\rangle$, $\langle\kappa|$ are eigen(co)vector of the transfer matirx

$$T_{\mathbf{M}}(\zeta,\kappa) = \mathrm{Tr}_j\Big[T_{j,\mathbf{M}}(\zeta)q^{\kappa\sigma_j^3}\Big].$$

We consider the expectation values

$$Z_{\mathbf{n}}\left\{q^{2\alpha S(0)}\mathcal{O}\right\} = \frac{\langle\kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\left(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\mathcal{O}\right)|\kappa\rangle}{\langle\kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\left(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\right)|\kappa\rangle},$$

where

$$T_{\mathbf{S},\mathbf{M}} = \prod_{j=-\infty}^{\overset{\curvearrowright}{\infty}} T_{j,\mathbf{M}}(1), \quad T_{j,\mathbf{M}}(\zeta) = \prod_{\mathbf{m}=1}^{\overset{\curvearrowleft}{\mathbf{n}}} L_{j,\mathbf{m}}(\zeta),$$

$$L_{j,\mathbf{m}}(\zeta) = q^{-\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta^2 q^{\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta(q-q^{-1})(\sigma_j^+\sigma_{\mathbf{m}}^- + \sigma_j^-\sigma_{\mathbf{m}}^+),$$

and $|\kappa\rangle$, $\langle\kappa|$ are eigen(co)vector of the transfer matirx

$$T_{\mathbf{M}}(\zeta,\kappa) = \mathrm{Tr}_j\left[T_{j,\mathbf{M}}(\zeta)q^{\kappa\sigma_j^3}\right].$$

We consider the expectation values

$$Z_{\mathbf{n}}\Big\{q^{2\alpha S(0)}\mathcal{O}\Big\} = \frac{\langle \kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\Big(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\mathcal{O}\Big)|\kappa\rangle}{\langle \kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\Big(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\Big)|\kappa\rangle},$$

where

$$T_{\mathbf{S},\mathbf{M}} = \prod_{j=-\infty}^{\curvearrowright \infty} T_{j,\mathbf{M}}(1), \quad T_{j,\mathbf{M}}(\zeta) = \prod_{\mathbf{m}=1}^{\curvearrowleft \mathbf{n}} L_{j,\mathbf{m}}(\zeta),$$

$$L_{j,\mathbf{m}}(\zeta) = q^{-\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta^2 q^{\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta(q-q^{-1})(\sigma_j^+\sigma_{\mathbf{m}}^- + \sigma_j^-\sigma_{\mathbf{m}}^+),$$

and $|\kappa\rangle$, $\langle\kappa|$ are eigen(co)vector of the transfer matirx

$$T_{\mathbf{M}}(\zeta,\kappa) = \mathrm{Tr}_j\Big[T_{j,\mathbf{M}}(\zeta)q^{\kappa\sigma_j^3}\Big].$$

We consider the expectation values

$$Z_{\mathbf{n}}\left\{q^{2\alpha S(0)}\mathcal{O}\right\} = \frac{\langle\kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\left(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\mathcal{O}\right)|\kappa\rangle}{\langle\kappa+\alpha|\mathrm{Tr}_{\mathbf{S}}\left(T_{\mathbf{S},\mathbf{M}}q^{2\kappa S+2\alpha S(0)}\right)|\kappa\rangle},$$

where

$$T_{\mathbf{S},\mathbf{M}} = \prod_{j=-\infty}^{\overset{\curvearrowright}{\infty}} T_{j,\mathbf{M}}(1), \quad T_{j,\mathbf{M}}(\zeta) = \prod_{\mathbf{m}=1}^{\overset{\curvearrowleft}{\mathbf{n}}} L_{j,\mathbf{m}}(\zeta),$$

$$L_{j,\mathbf{m}}(\zeta) = q^{-\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta^2 q^{\frac{1}{2}\sigma_j^3\sigma_{\mathbf{m}}^3} - \zeta(q-q^{-1})(\sigma_j^+\sigma_{\mathbf{m}}^- + \sigma_j^-\sigma_{\mathbf{m}}^+),$$

and $|\kappa\rangle$, $\langle\kappa|$ are eigen(co)vector of the transfer matirx

$$T_{\mathbf{M}}(\zeta,\kappa) = \mathrm{Tr}_j\left[T_{j,\mathbf{M}}(\zeta)q^{\kappa\sigma_j^3}\right].$$

Fermions on the lattice

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}_p(\zeta^2-1)^{-p},\quad \mathbf{b}^*(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}^*_p(\zeta^2-1)^{p-1},\ etc.$$

such that

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}_p(\zeta^2-1)^{-p},\quad \mathbf{b}^*(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}^*_p(\zeta^2-1)^{p-1}, etc.$$

such that

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta)\,,$$

$$\mathbf{b}(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}_p(\zeta^2-1)^{-p}\,,\quad \mathbf{b}^*(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}^*_p(\zeta^2-1)^{p-1}\,,\ etc.$$

such that

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta) = \sum_{p=1}^{\infty} \mathbf{b}_p(\zeta^2 - 1)^{-p}, \quad \mathbf{b}^*(\zeta) = \sum_{p=1}^{\infty} \mathbf{b}^*_p(\zeta^2 - 1)^{p-1}, \textit{etc.}$$

such that

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta) = \sum_{p=1}^{\infty} \mathbf{b}_p(\zeta^2 - 1)^{-p}, \quad \mathbf{b}^*(\zeta) = \sum_{p=1}^{\infty} \mathbf{b}^*_p(\zeta^2 - 1)^{p-1}, \, etc.$$

such that

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}_p(\zeta^2-1)^{-p},\quad \mathbf{b}^*(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}^*_p(\zeta^2-1)^{p-1},\ etc.$$

such that

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta) = \sum_{p=1}^{\infty} \mathbf{b}_p(\zeta^2-1)^{-p}, \quad \mathbf{b}^*(\zeta) = \sum_{p=1}^{\infty} \mathbf{b}^*_p(\zeta^2-1)^{p-1}, \textit{etc.}$$

such that

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}_p(\zeta^2-1)^{-p},\quad \mathbf{b}^*(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}^*_p(\zeta^2-1)^{p-1},\ etc.$$

such that

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}_p(\zeta^2-1)^{-p},\quad \mathbf{b}^*(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}^*_p(\zeta^2-1)^{p-1},\ etc.$$

such that

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta) = \sum_{p=1}^{\infty} \mathbf{b}_p(\zeta^2-1)^{-p}, \quad \mathbf{b}^*(\zeta) = \sum_{p=1}^{\infty} \mathbf{b}^*_p(\zeta^2-1)^{p-1}, etc.$$

such that

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}_p(\zeta^2-1)^{-p}, \quad \mathbf{b}^*(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}^*_p(\zeta^2-1)^{p-1}, \textit{etc.}$$

such that

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta) = \sum_{p=1}^{\infty} \mathbf{b}_p(\zeta^2 - 1)^{-p}, \quad \mathbf{b}^*(\zeta) = \sum_{p=1}^{\infty} \mathbf{b}^*_p(\zeta^2 - 1)^{p-1}, \, etc.$$

such that

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}_p(\zeta^2-1)^{-p},\quad \mathbf{b}^*(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}^*_p(\zeta^2-1)^{p-1},\ etc.$$

such that

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}_p(\zeta^2-1)^{-p},\quad \mathbf{b}^*(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}^*_p(\zeta^2-1)^{p-1},\ etc.$$

such that

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta) = \sum_{p=1}^{\infty} \mathbf{b}_p(\zeta^2-1)^{-p}, \quad \mathbf{b}^*(\zeta) = \sum_{p=1}^{\infty} \mathbf{b}^*_p(\zeta^2-1)^{p-1}, \ etc.$$

such that

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta) = \sum_{p=1}^{\infty} \mathbf{b}_p(\zeta^2-1)^{-p}, \quad \mathbf{b}^*(\zeta) = \sum_{p=1}^{\infty} \mathbf{b}^*_p(\zeta^2-1)^{p-1}, \textit{etc.}$$

such that

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}_p(\zeta^2-1)^{-p},\quad \mathbf{b}^*(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}^*_p(\zeta^2-1)^{p-1},\ etc.$$

such that

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}_p(\zeta^2-1)^{-p},\quad \mathbf{b}^*(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}^*_p(\zeta^2-1)^{p-1},\ etc.$$

such that

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}_p(\zeta^2-1)^{-p},\quad \mathbf{b}^*(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}^*_p(\zeta^2-1)^{p-1},\ etc.$$

such that

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}_p(\zeta^2-1)^{-p},\quad \mathbf{b}^*(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}^*_p(\zeta^2-1)^{p-1},\ etc.$$

such that

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}_p(\zeta^2-1)^{-p},\quad \mathbf{b}^*(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}^*_p(\zeta^2-1)^{p-1},\ etc.$$

such that

- They commute with integrals of motion: $\mathbf{t}^*_1, \mathbf{t}^*_2, \cdots$

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}_p(\zeta^2-1)^{-p},\quad \mathbf{b}^*(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}^*_p(\zeta^2-1)^{p-1},\ etc.$$

such that

- They commute with integrals of motion: $\mathbf{t}^*_1, \mathbf{t}^*_2, \cdots$

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta) = \sum_{p=1}^{\infty} \mathbf{b}_p(\zeta^2 - 1)^{-p}, \quad \mathbf{b}^*(\zeta) = \sum_{p=1}^{\infty} \mathbf{b}^*_p(\zeta^2 - 1)^{p-1}, \ etc.$$

such that

- They commute with integrals of motion: $\mathbf{t}^*_1, \mathbf{t}^*_2, \cdots$

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}_p(\zeta^2-1)^{-p},\quad \mathbf{b}^*(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}^*_p(\zeta^2-1)^{p-1},\ etc.$$

such that

- They commute with integrals of motion: $\mathbf{t}^*_1, \mathbf{t}^*_2, \cdots$

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta) = \sum_{p=1}^{\infty} \mathbf{b}_p(\zeta^2-1)^{-p}, \quad \mathbf{b}^*(\zeta) = \sum_{p=1}^{\infty} \mathbf{b}^*_p(\zeta^2-1)^{p-1}, \textit{etc.}$$

such that

- They commute with integrals of motion: $\mathbf{t}^*_1, \mathbf{t}^*_2, \cdots$

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}_p(\zeta^2-1)^{-p},\quad \mathbf{b}^*(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}^*_p(\zeta^2-1)^{p-1},\ etc.$$

such that

- They commute with integrals of motion: $\mathbf{t}^*_1, \mathbf{t}^*_2, \cdots$
- The following is a basis of $\mathcal{W}^{(\alpha)}$:

$$(\mathbf{t}^*_1)^p\mathbf{t}^*_{i_1}\cdots\mathbf{t}^*_{i_r}\mathbf{b}^*_{j_1}\cdots\mathbf{b}^*_{j_s}\mathbf{c}^*_{k_1}\cdots\mathbf{c}^*_{k_t}(q^{2\alpha S(0)})$$
$$(i_1\geq\cdots\geq i_r\geq 2,\ j_1>\cdots>j_s\geq 1,$$
$$k_1>\cdots>k_t\geq 1,\ p\in\mathbb{Z},\ r,s,t\geq 0).$$

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}_p(\zeta^2-1)^{-p},\quad \mathbf{b}^*(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}^*_p(\zeta^2-1)^{p-1},\ etc.$$

such that

- They commute with integrals of motion: $\mathbf{t}^*_1, \mathbf{t}^*_2, \cdots$
- The following is a basis of $\mathcal{W}^{(\alpha)}$:

$$(\mathbf{t}^*_1)^p\mathbf{t}^*_{i_1}\cdots\mathbf{t}^*_{i_r}\mathbf{b}^*_{j_1}\cdots\mathbf{b}^*_{j_s}\mathbf{c}^*_{k_1}\cdots\mathbf{c}^*_{k_t}(q^{2\alpha S(0)})$$
$$(i_1\geq\cdots\geq i_r\geq 2,\ j_1>\cdots>j_s\geq 1,$$
$$k_1>\cdots>k_t\geq 1,\ p\in\mathbb{Z},\ r,s,t\geq 0).$$

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$

$$\mathbf{b}(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}_p(\zeta^2-1)^{-p},\quad \mathbf{b}^*(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}^*_p(\zeta^2-1)^{p-1},\ etc.$$

such that

- They commute with integrals of motion: $\mathbf{t}^*_1,\mathbf{t}^*_2,\cdots$
- The following is a basis of $\mathcal{W}^{(\alpha)}$:

$$(\mathbf{t}^*_1)^p\mathbf{t}^*_{i_1}\cdots\mathbf{t}^*_{i_r}\mathbf{b}^*_{j_1}\cdots\mathbf{b}^*_{j_s}\mathbf{c}^*_{k_1}\cdots\mathbf{c}^*_{k_t}(q^{2\alpha S(0)})$$
$$(i_1\geq\cdots\geq i_r\geq 2,\ j_1>\cdots>j_s\geq 1,$$
$$k_1>\cdots>k_t\geq 1,\ p\in\mathbb{Z},\ r,s,t\geq 0)\,.$$

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}_p(\zeta^2-1)^{-p},\quad \mathbf{b}^*(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}^*_p(\zeta^2-1)^{p-1},\ etc.$$

such that

- They commute with integrals of motion: $\mathbf{t}^*_1, \mathbf{t}^*_2, \cdots$
- The following is a basis of $\mathcal{W}^{(\alpha)}$:

$$(\mathbf{t}^*_1)^p\mathbf{t}^*_{i_1}\cdots\mathbf{t}^*_{i_r}\mathbf{b}^*_{j_1}\cdots\mathbf{b}^*_{j_s}\mathbf{c}^*_{k_1}\cdots\mathbf{c}^*_{k_t}(q^{2\alpha S(0)})$$
$$(i_1\ge\cdots\ge i_r\ge 2,\ j_1>\cdots>j_s\ge 1,$$
$$k_1>\cdots>k_t\ge 1,\ p\in\mathbb{Z},\ r,s,t\ge 0).$$

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}_p(\zeta^2-1)^{-p}, \quad \mathbf{b}^*(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}^*_p(\zeta^2-1)^{p-1}, etc.$$

such that

- They commute with integrals of motion: $\mathbf{t}^*_1, \mathbf{t}^*_2, \cdots$
- The following is a basis of $\mathcal{W}^{(\alpha)}$:

$$(\mathbf{t}^*_1)^p\mathbf{t}^*_{i_1}\cdots\mathbf{t}^*_{i_r}\mathbf{b}^*_{j_1}\cdots\mathbf{b}^*_{j_s}\mathbf{c}^*_{k_1}\cdots\mathbf{c}^*_{k_t}(q^{2\alpha S(0)})$$
$$(i_1\geq\cdots\geq i_r\geq 2,\ j_1>\cdots>j_s\geq 1,$$
$$k_1>\cdots>k_t\geq 1,\ p\in\mathbb{Z},\ r,s,t\geq 0).$$

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}_p(\zeta^2-1)^{-p},\quad \mathbf{b}^*(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}^*_p(\zeta^2-1)^{p-1},\ etc.$$

such that

- They commute with integrals of motion: $\mathbf{t}^*_1, \mathbf{t}^*_2, \cdots$
- The following is a basis of $\mathcal{W}^{(\alpha)}$:

$$(\mathbf{t}^*_1)^p\mathbf{t}^*_{i_1}\cdots\mathbf{t}^*_{i_r}\mathbf{b}^*_{j_1}\cdots\mathbf{b}^*_{j_s}\mathbf{c}^*_{k_1}\cdots\mathbf{c}^*_{k_t}(q^{2\alpha S(0)})$$
$$(i_1\geq\cdots\geq i_r\geq 2,\ j_1>\cdots>j_s\geq 1,$$
$$k_1>\cdots>k_t\geq 1,\ p\in\mathbb{Z},\ r,s,t\geq 0)\,.$$

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}_p(\zeta^2-1)^{-p},\quad \mathbf{b}^*(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}^*_p(\zeta^2-1)^{p-1}, etc.$$

such that

- They commute with integrals of motion: $\mathbf{t}^*_1, \mathbf{t}^*_2, \cdots$
- The following is a basis of $\mathcal{W}^{(\alpha)}$:

$$(\mathbf{t}^*_1)^p\mathbf{t}^*_{i_1}\cdots\mathbf{t}^*_{i_r}\mathbf{b}^*_{j_1}\cdots\mathbf{b}^*_{j_s}\mathbf{c}^*_{k_1}\cdots\mathbf{c}^*_{k_t}(q^{2\alpha S(0)})$$
$$(i_1\geq\cdots\geq i_r\geq 2,\ j_1>\cdots>j_s\geq 1,$$
$$k_1>\cdots>k_t\geq 1,\ p\in\mathbb{Z},\ r,s,t\geq 0).$$

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}_p(\zeta^2-1)^{-p},\quad \mathbf{b}^*(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}^*_p(\zeta^2-1)^{p-1},\ etc.$$

such that

- They commute with integrals of motion: $\mathbf{t}^*_1,\mathbf{t}^*_2,\cdots$
- The following is a basis of $\mathcal{W}^{(\alpha)}$:

$$(\mathbf{t}^*_1)^p\mathbf{t}^*_{i_1}\cdots\mathbf{t}^*_{i_r}\mathbf{b}^*_{j_1}\cdots\mathbf{b}^*_{j_s}\mathbf{c}^*_{k_1}\cdots\mathbf{c}^*_{k_t}(q^{2\alpha S(0)})$$
$$(i_1\geq\cdots\geq i_r\geq 2,\ j_1>\cdots>j_s\geq 1,$$
$$k_1>\cdots>k_t\geq 1,\ p\in\mathbb{Z},\ r,s,t\geq 0).$$

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}_p(\zeta^2-1)^{-p},\quad \mathbf{b}^*(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}^*_p(\zeta^2-1)^{p-1},\ etc.$$

such that

- They commute with integrals of motion: $\mathbf{t}^*_1, \mathbf{t}^*_2, \cdots$
- The following is a basis of $\mathcal{W}^{(\alpha)}$:

$$(\mathbf{t}^*_1)^p\mathbf{t}^*_{i_1}\cdots\mathbf{t}^*_{i_r}\mathbf{b}^*_{j_1}\cdots\mathbf{b}^*_{j_s}\mathbf{c}^*_{k_1}\cdots\mathbf{c}^*_{k_t}(q^{2\alpha S(0)})$$
$$(i_1\geq\cdots\geq i_r\geq 2,\ j_1>\cdots>j_s\geq 1,$$
$$k_1>\cdots>k_t\geq 1,\ p\in\mathbb{Z},\ r,s,t\geq 0).$$

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}_p(\zeta^2-1)^{-p},\quad \mathbf{b}^*(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}^*_p(\zeta^2-1)^{p-1},\ etc.$$

such that

- They commute with integrals of motion: $\mathbf{t}^*_1,\mathbf{t}^*_2,\cdots$
- The following is a basis of $\mathcal{W}^{(\alpha)}$:

$$(\mathbf{t}^*_1)^p\mathbf{t}^*_{i_1}\cdots\mathbf{t}^*_{i_r}\mathbf{b}^*_{j_1}\cdots\mathbf{b}^*_{j_s}\mathbf{c}^*_{k_1}\cdots\mathbf{c}^*_{k_t}(q^{2\alpha S(0)})$$

$$(i_1\geq\cdots\geq i_r\geq 2,\ j_1>\cdots>j_s\geq 1,$$

$$k_1>\cdots>k_t\geq 1,\ p\in\mathbb{Z},\ r,s,t\geq 0).$$

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}_p(\zeta^2-1)^{-p},\quad \mathbf{b}^*(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}^*_p(\zeta^2-1)^{p-1},\ etc.$$

such that

- They commute with integrals of motion: $\mathbf{t}^*_1, \mathbf{t}^*_2, \cdots$
- The following is a basis of $\mathcal{W}^{(\alpha)}$:

$$(\mathbf{t}^*_1)^p\mathbf{t}^*_{i_1}\cdots\mathbf{t}^*_{i_r}\mathbf{b}^*_{j_1}\cdots\mathbf{b}^*_{j_s}\mathbf{c}^*_{k_1}\cdots\mathbf{c}^*_{k_t}(q^{2\alpha S(0)})$$
$$(i_1\geq\cdots\geq i_r\geq 2,\ j_1>\cdots>j_s\geq 1,$$
$$k_1>\cdots>k_t\geq 1,\ p\in\mathbb{Z},\ r,s,t\geq 0).$$

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}_p(\zeta^2-1)^{-p},\quad \mathbf{b}^*(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}^*_p(\zeta^2-1)^{p-1},\ etc.$$

such that

- They commute with integrals of motion: $\mathbf{t}^*_1, \mathbf{t}^*_2, \cdots$
- The following is a basis of $\mathcal{W}^{(\alpha)}$:

$$(\mathbf{t}^*_1)^p\mathbf{t}^*_{i_1}\cdots\mathbf{t}^*_{i_r}\mathbf{b}^*_{j_1}\cdots\mathbf{b}^*_{j_s}\mathbf{c}^*_{k_1}\cdots\mathbf{c}^*_{k_t}(q^{2\alpha S(0)})$$
$$(i_1\geq\cdots\geq i_r\geq 2,\ j_1>\cdots>j_s\geq 1,$$
$$k_1>\cdots>k_t\geq 1,\ p\in\mathbb{Z},\ r,s,t\geq 0).$$

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}_p(\zeta^2-1)^{-p},\quad \mathbf{b}^*(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}^*_p(\zeta^2-1)^{p-1},\ etc.$$

such that

- They commute with integrals of motion: $\mathbf{t}^*_1, \mathbf{t}^*_2, \cdots$
- The following is a basis of $\mathcal{W}^{(\alpha)}$:

$$(\mathbf{t}^*_1)^p\mathbf{t}^*_{i_1}\cdots\mathbf{t}^*_{i_r}\mathbf{b}^*_{j_1}\cdots\mathbf{b}^*_{j_s}\mathbf{c}^*_{k_1}\cdots\mathbf{c}^*_{k_t}(q^{2\alpha S(0)})$$
$$(i_1\geq\cdots\geq i_r\geq 2,\ j_1>\cdots>j_s\geq 1,$$
$$k_1>\cdots>k_t\geq 1,\ p\in\mathbb{Z},\ r,s,t\geq 0).$$

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}_p(\zeta^2-1)^{-p},\quad \mathbf{b}^*(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}^*_p(\zeta^2-1)^{p-1}, etc.$$

such that

- They commute with integrals of motion: $\mathbf{t}^*_1, \mathbf{t}^*_2, \cdots$
- The following is a basis of $\mathcal{W}^{(\alpha)}$:

$$(\mathbf{t}^*_1)^p\mathbf{t}^*_{i_1}\cdots\mathbf{t}^*_{i_r}\mathbf{b}^*_{j_1}\cdots\mathbf{b}^*_{j_s}\mathbf{c}^*_{k_1}\cdots\mathbf{c}^*_{k_t}(q^{2\alpha S(0)})$$
$$(i_1\geq\cdots\geq i_r\geq 2,\ j_1>\cdots>j_s\geq 1,$$
$$k_1>\cdots>k_t\geq 1,\ p\in\mathbb{Z},\ r,s,t\geq 0)\,.$$

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}_p(\zeta^2-1)^{-p},\quad \mathbf{b}^*(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}^*_p(\zeta^2-1)^{p-1},\ etc.$$

such that

- They commute with integrals of motion: $\mathbf{t}^*_1, \mathbf{t}^*_2, \cdots$
- The following is a basis of $\mathcal{W}^{(\alpha)}$:

$$(\mathbf{t}^*_1)^p\mathbf{t}^*_{i_1}\cdots\mathbf{t}^*_{i_r}\mathbf{b}^*_{j_1}\cdots\mathbf{b}^*_{j_s}\mathbf{c}^*_{k_1}\cdots\mathbf{c}^*_{k_t}(q^{2\alpha S(0)})$$
$$(i_1\geq\cdots\geq i_r\geq 2,\ j_1>\cdots>j_s\geq 1,$$
$$k_1>\cdots>k_t\geq 1,\ p\in\mathbb{Z},\ r,s,t\geq 0).$$

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}_p(\zeta^2-1)^{-p},\quad \mathbf{b}^*(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}^*_p(\zeta^2-1)^{p-1}, etc.$$

such that

- They commute with integrals of motion: $\mathbf{t}^*_1, \mathbf{t}^*_2, \cdots$
- The following is a basis of $\mathcal{W}^{(\alpha)}$:

$$(\mathbf{t}^*_1)^p\mathbf{t}^*_{i_1}\cdots\mathbf{t}^*_{i_r}\mathbf{b}^*_{j_1}\cdots\mathbf{b}^*_{j_s}\mathbf{c}^*_{k_1}\cdots\mathbf{c}^*_{k_t}(q^{2\alpha S(0)})$$
$$(i_1\geq\cdots\geq i_r\geq 2,\ j_1>\cdots>j_s\geq 1,$$
$$k_1>\cdots>k_t\geq 1,\ p\in\mathbb{Z},\ r,s,t\geq 0)\,.$$

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}_p(\zeta^2-1)^{-p},\quad \mathbf{b}^*(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}^*_p(\zeta^2-1)^{p-1},\ etc.$$

such that

- They commute with integrals of motion: $\mathbf{t}^*_1, \mathbf{t}^*_2, \cdots$
- The following is a basis of $\mathcal{W}^{(\alpha)}$:

$$(\mathbf{t}^*_1)^p\mathbf{t}^*_{i_1}\cdots\mathbf{t}^*_{i_r}\mathbf{b}^*_{j_1}\cdots\mathbf{b}^*_{j_s}\mathbf{c}^*_{k_1}\cdots\mathbf{c}^*_{k_t}(q^{2\alpha S(0)})$$
$$(i_1\geq\cdots\geq i_r\geq 2,\ j_1>\cdots>j_s\geq 1,$$
$$k_1>\cdots>k_t\geq 1,\ p\in\mathbb{Z},\ r,s,t\geq 0).$$

These fermions are introduced via a sophisticated application of techniques from the algebraic Bethe Ansatz.

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}_p(\zeta^2-1)^{-p},\quad \mathbf{b}^*(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}^*_p(\zeta^2-1)^{p-1},\ etc.$$

such that

- They commute with integrals of motion: $\mathbf{t}^*_1, \mathbf{t}^*_2, \cdots$
- The following is a basis of $\mathcal{W}^{(\alpha)}$:

$$(\mathbf{t}^*_1)^p\mathbf{t}^*_{i_1}\cdots\mathbf{t}^*_{i_r}\mathbf{b}^*_{j_1}\cdots\mathbf{b}^*_{j_s}\mathbf{c}^*_{k_1}\cdots\mathbf{c}^*_{k_t}(q^{2\alpha S(0)})$$
$$(i_1\geq\cdots\geq i_r\geq 2,\ j_1>\cdots>j_s\geq 1,$$
$$k_1>\cdots>k_t\geq 1,\ p\in\mathbb{Z},\ r,s,t\geq 0).$$

These fermions are introduced via a sophisticated application of techniques from the algebraic Bethe Ansatz.

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta) = \sum_{p=1}^{\infty} \mathbf{b}_p(\zeta^2-1)^{-p}, \quad \mathbf{b}^*(\zeta) = \sum_{p=1}^{\infty} \mathbf{b}^*_p(\zeta^2-1)^{p-1}, \textit{ etc.}$$

such that

- They commute with integrals of motion: $\mathbf{t}^*_1, \mathbf{t}^*_2, \cdots$
- The following is a basis of $\mathcal{W}^{(\alpha)}$:

$$(\mathbf{t}^*_1)^p \mathbf{t}^*_{i_1} \cdots \mathbf{t}^*_{i_r} \mathbf{b}^*_{j_1} \cdots \mathbf{b}^*_{j_s} \mathbf{c}^*_{k_1} \cdots \mathbf{c}^*_{k_t} (q^{2\alpha S(0)})$$
$$(i_1 \geq \cdots \geq i_r \geq 2,\ j_1 > \cdots > j_s \geq 1,$$
$$k_1 > \cdots > k_t \geq 1,\ p \in \mathbb{Z},\ r, s, t \geq 0).$$

These fermions are introduced via a sophisticated application of techniques from the algebraic Bethe Ansatz.

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}_p(\zeta^2-1)^{-p},\quad \mathbf{b}^*(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}^*_p(\zeta^2-1)^{p-1},\ etc.$$

such that

- They commute with integrals of motion: $\mathbf{t}^*_1, \mathbf{t}^*_2, \cdots$
- The following is a basis of $\mathcal{W}^{(\alpha)}$:

$$(\mathbf{t}^*_1)^p\mathbf{t}^*_{i_1}\cdots\mathbf{t}^*_{i_r}\mathbf{b}^*_{j_1}\cdots\mathbf{b}^*_{j_s}\mathbf{c}^*_{k_1}\cdots\mathbf{c}^*_{k_t}(q^{2\alpha S(0)})$$
$$(i_1\geq\cdots\geq i_r\geq 2,\ j_1>\cdots>j_s\geq 1,$$
$$k_1>\cdots>k_t\geq 1,\ p\in\mathbb{Z},\ r,s,t\geq 0)\,.$$

These fermions are introduced via a sophisticated application of techniques from the algebraic Bethe Ansatz.

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta) = \sum_{p=1}^{\infty} \mathbf{b}_p(\zeta^2-1)^{-p}, \quad \mathbf{b}^*(\zeta) = \sum_{p=1}^{\infty} \mathbf{b}^*_p(\zeta^2-1)^{p-1}, \textit{etc.}$$

such that

- They commute with integrals of motion: $\mathbf{t}^*_1, \mathbf{t}^*_2, \cdots$
- The following is a basis of $\mathcal{W}^{(\alpha)}$:

$$(\mathbf{t}^*_1)^p \mathbf{t}^*_{i_1} \cdots \mathbf{t}^*_{i_r} \mathbf{b}^*_{j_1} \cdots \mathbf{b}^*_{j_s} \mathbf{c}^*_{k_1} \cdots \mathbf{c}^*_{k_t} (q^{2\alpha S(0)})$$
$$(i_1 \geq \cdots \geq i_r \geq 2,\ j_1 > \cdots > j_s \geq 1,$$
$$k_1 > \cdots > k_t \geq 1,\ p \in \mathbb{Z},\ r, s, t \geq 0).$$

These fermions are introduced via a sophisticated application of techniques from the algebraic Bethe Ansatz.

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}_p(\zeta^2-1)^{-p},\quad \mathbf{b}^*(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}^*_p(\zeta^2-1)^{p-1},\ etc.$$

such that

- They commute with integrals of motion: $\mathbf{t}^*_1, \mathbf{t}^*_2, \cdots$
- The following is a basis of $\mathcal{W}^{(\alpha)}$:

$$(\mathbf{t}^*_1)^p\mathbf{t}^*_{i_1}\cdots\mathbf{t}^*_{i_r}\mathbf{b}^*_{j_1}\cdots\mathbf{b}^*_{j_s}\mathbf{c}^*_{k_1}\cdots\mathbf{c}^*_{k_t}(q^{2\alpha S(0)})$$
$$(i_1\geq\cdots\geq i_r\geq 2,\ j_1>\cdots>j_s\geq 1,$$
$$k_1>\cdots>k_t\geq 1,\ p\in\mathbb{Z},\ r,s,t\geq 0).$$

These fermions are introduced via a sophisticated application of techniques from the algebraic Bethe Ansatz.

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}_p(\zeta^2-1)^{-p},\quad \mathbf{b}^*(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}^*_p(\zeta^2-1)^{p-1},\ etc.$$

such that

- They commute with integrals of motion: $\mathbf{t}^*_1, \mathbf{t}^*_2, \cdots$
- The following is a basis of $\mathcal{W}^{(\alpha)}$:

$$(\mathbf{t}^*_1)^p\mathbf{t}^*_{i_1}\cdots\mathbf{t}^*_{i_r}\mathbf{b}^*_{j_1}\cdots\mathbf{b}^*_{j_s}\mathbf{c}^*_{k_1}\cdots\mathbf{c}^*_{k_t}(q^{2\alpha S(0)})$$
$$(i_1\geq\cdots\geq i_r\geq 2,\ j_1>\cdots>j_s\geq 1,$$
$$k_1>\cdots>k_t\geq 1,\ p\in\mathbb{Z},\ r,s,t\geq 0)\,.$$

These fermions are introduced via a sophisticated application of techniques from the algebraic Bethe Ansatz.

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}_p(\zeta^2-1)^{-p}, \quad \mathbf{b}^*(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}^*_p(\zeta^2-1)^{p-1}, etc.$$

such that

- They commute with integrals of motion: $\mathbf{t}^*_1, \mathbf{t}^*_2, \cdots$
- The following is a basis of $\mathcal{W}^{(\alpha)}$:

$$(\mathbf{t}^*_1)^p\mathbf{t}^*_{i_1}\cdots\mathbf{t}^*_{i_r}\mathbf{b}^*_{j_1}\cdots\mathbf{b}^*_{j_s}\mathbf{c}^*_{k_1}\cdots\mathbf{c}^*_{k_t}(q^{2\alpha S(0)})$$
$$(i_1\geq\cdots\geq i_r\geq 2,\ j_1>\cdots>j_s\geq 1,$$
$$k_1>\cdots>k_t\geq 1,\ p\in\mathbb{Z},\ r,s,t\geq 0).$$

These fermions are introduced via a sophisticated application of techniques from the algebraic Bethe Ansatz.

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}_p(\zeta^2-1)^{-p},\quad \mathbf{b}^*(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}^*_p(\zeta^2-1)^{p-1},\ etc.$$

such that

- They commute with integrals of motion: $\mathbf{t}^*_1, \mathbf{t}^*_2, \cdots$
- The following is a basis of $\mathcal{W}^{(\alpha)}$:

$$(\mathbf{t}^*_1)^p\mathbf{t}^*_{i_1}\cdots\mathbf{t}^*_{i_r}\mathbf{b}^*_{j_1}\cdots\mathbf{b}^*_{j_s}\mathbf{c}^*_{k_1}\cdots\mathbf{c}^*_{k_t}(q^{2\alpha S(0)})$$
$$(i_1\geq\cdots\geq i_r\geq 2,\ j_1>\cdots>j_s\geq 1,$$
$$k_1>\cdots>k_t\geq 1,\ p\in\mathbb{Z},\ r,s,t\geq 0)\,.$$

These fermions are introduced via a sophisticated application of techniques from the algebraic Bethe Ansatz.

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}_p(\zeta^2-1)^{-p},\quad \mathbf{b}^*(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}^*_p(\zeta^2-1)^{p-1}, etc.$$

such that

- They commute with integrals of motion: $\mathbf{t}^*_1,\mathbf{t}^*_2,\cdots$
- The following is a basis of $\mathcal{W}^{(\alpha)}$:

$$(\mathbf{t}^*_1)^p\mathbf{t}^*_{i_1}\cdots\mathbf{t}^*_{i_r}\mathbf{b}^*_{j_1}\cdots\mathbf{b}^*_{j_s}\mathbf{c}^*_{k_1}\cdots\mathbf{c}^*_{k_t}(q^{2\alpha S(0)})$$
$$(i_1\geq\cdots\geq i_r\geq 2,\ j_1>\cdots>j_s\geq 1,$$
$$k_1>\cdots>k_t\geq 1,\ p\in\mathbb{Z},\ r,s,t\geq 0).$$

These fermions are introduced via a sophisticated application of techniques from the algebraic Bethe Ansatz.

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}_p(\zeta^2-1)^{-p},\quad \mathbf{b}^*(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}^*_p(\zeta^2-1)^{p-1}, etc.$$

such that

- They commute with integrals of motion: $\mathbf{t}^*_1, \mathbf{t}^*_2, \cdots$
- The following is a basis of $\mathcal{W}^{(\alpha)}$:

$$(\mathbf{t}^*_1)^p\mathbf{t}^*_{i_1}\cdots\mathbf{t}^*_{i_r}\mathbf{b}^*_{j_1}\cdots\mathbf{b}^*_{j_s}\mathbf{c}^*_{k_1}\cdots\mathbf{c}^*_{k_t}(q^{2\alpha S(0)})$$
$$(i_1\geq\cdots\geq i_r\geq 2,\ j_1>\cdots>j_s\geq 1,$$
$$k_1>\cdots>k_t\geq 1,\ p\in\mathbb{Z},\ r,s,t\geq 0)\,.$$

These fermions are introduced via a sophisticated application of techniques from the algebraic Bethe Ansatz.

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}_p(\zeta^2-1)^{-p},\quad \mathbf{b}^*(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}^*_p(\zeta^2-1)^{p-1},\ etc.$$

such that

- They commute with integrals of motion: $\mathbf{t}^*_1, \mathbf{t}^*_2, \cdots$
- The following is a basis of $\mathcal{W}^{(\alpha)}$:

$$(\mathbf{t}^*_1)^p\mathbf{t}^*_{i_1}\cdots\mathbf{t}^*_{i_r}\mathbf{b}^*_{j_1}\cdots\mathbf{b}^*_{j_s}\mathbf{c}^*_{k_1}\cdots\mathbf{c}^*_{k_t}(q^{2\alpha S(0)})$$
$$(i_1\geq\cdots\geq i_r\geq 2,\ j_1>\cdots>j_s\geq 1,$$
$$k_1>\cdots>k_t\geq 1,\ p\in\mathbb{Z},\ r,s,t\geq 0).$$

These fermions are introduced via a sophisticated application of techniques from the algebraic Bethe Ansatz.

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}_p(\zeta^2-1)^{-p},\quad \mathbf{b}^*(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}^*_p(\zeta^2-1)^{p-1},\ etc.$$

such that

- They commute with integrals of motion: $\mathbf{t}^*_1,\mathbf{t}^*_2,\cdots$
- The following is a basis of $\mathcal{W}^{(\alpha)}$:

$$(\mathbf{t}^*_1)^p\mathbf{t}^*_{i_1}\cdots\mathbf{t}^*_{i_r}\mathbf{b}^*_{j_1}\cdots\mathbf{b}^*_{j_s}\mathbf{c}^*_{k_1}\cdots\mathbf{c}^*_{k_t}(q^{2\alpha S(0)})$$
$$(i_1\geq\cdots\geq i_r\geq 2,\ j_1>\cdots>j_s\geq 1,$$
$$k_1>\cdots>k_t\geq 1,\ p\in\mathbb{Z},\ r,s,t\geq 0).$$

These fermions are introduced via a sophisticated application of techniques from the algebraic Bethe Ansatz.

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}_p(\zeta^2-1)^{-p},\quad \mathbf{b}^*(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}^*_p(\zeta^2-1)^{p-1},\ etc.$$

such that

- They commute with integrals of motion: $\mathbf{t}^*_1, \mathbf{t}^*_2, \cdots$
- The following is a basis of $\mathcal{W}^{(\alpha)}$:

$$(\mathbf{t}^*_1)^p\mathbf{t}^*_{i_1}\cdots\mathbf{t}^*_{i_r}\mathbf{b}^*_{j_1}\cdots\mathbf{b}^*_{j_s}\mathbf{c}^*_{k_1}\cdots\mathbf{c}^*_{k_t}(q^{2\alpha S(0)})$$
$$(i_1\geq\cdots\geq i_r\geq 2,\ j_1>\cdots>j_s\geq 1,$$
$$k_1>\cdots>k_t\geq 1,\ p\in\mathbb{Z},\ r,s,t\geq 0)\,.$$

These fermions are introduced via a sophisticated application of techniques from the algebraic Bethe Ansatz.

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}_p(\zeta^2-1)^{-p},\quad \mathbf{b}^*(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}^*_p(\zeta^2-1)^{p-1},\ etc.$$

such that

- They commute with integrals of motion: $\mathbf{t}^*_1, \mathbf{t}^*_2, \cdots$
- The following is a basis of $\mathcal{W}^{(\alpha)}$:

$$(\mathbf{t}^*_1)^p\mathbf{t}^*_{i_1}\cdots\mathbf{t}^*_{i_r}\mathbf{b}^*_{j_1}\cdots\mathbf{b}^*_{j_s}\mathbf{c}^*_{k_1}\cdots\mathbf{c}^*_{k_t}(q^{2\alpha S(0)})$$
$$(i_1\geq\cdots\geq i_r\geq 2,\ j_1>\cdots>j_s\geq 1,$$
$$k_1>\cdots>k_t\geq 1,\ p\in\mathbb{Z},\ r,s,t\geq 0).$$

These fermions are introduced via a sophisticated application of techniques from the algebraic Bethe Ansatz.

Fermions on the lattice

One can construct fermions acting on $\mathcal{W}^{(\alpha)}$ (BJMST 2007–2009)

$$\mathbf{b}(\zeta),\ \mathbf{c}(\zeta),\ \mathbf{b}^*(\zeta),\ \mathbf{c}^*(\zeta),$$

$$\mathbf{b}(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}_p(\zeta^2-1)^{-p},\quad \mathbf{b}^*(\zeta)=\sum_{p=1}^{\infty}\mathbf{b}^*_p(\zeta^2-1)^{p-1}, etc.$$

such that

- They commute with integrals of motion: $\mathbf{t}^*_1, \mathbf{t}^*_2, \cdots$
- The following is a basis of $\mathcal{W}^{(\alpha)}$:

$$(\mathbf{t}^*_1)^p\mathbf{t}^*_{i_1}\cdots\mathbf{t}^*_{i_r}\mathbf{b}^*_{j_1}\cdots\mathbf{b}^*_{j_s}\mathbf{c}^*_{k_1}\cdots\mathbf{c}^*_{k_t}(q^{2\alpha S(0)})$$
$$(i_1\geq\cdots\geq i_r\geq 2,\ j_1>\cdots>j_s\geq 1,$$
$$k_1>\cdots>k_t\geq 1,\ p\in\mathbb{Z},\ r,s,t\geq 0).$$

These fermions are introduced via a sophisticated application of techniques from the algebraic Bethe Ansatz.

The main formula

The following is the key result (JMS 2009).

The main formula

The following is the key result (JMS 2009).

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)(q^{2\alpha S(0)})\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right).$$

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)(q^{2\alpha S(0)})\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right).$$

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)(q^{2\alpha S(0)})\right\}$$

$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right),$$

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)\left(q^{2\alpha S(0)}\right)\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right),$$

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)\left(q^{2\alpha S(0)}\right)\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right),$$

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)(q^{2\alpha S(0)})\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right).$$

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)(q^{2\alpha S(0)})\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right).$$

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)\left(q^{2\alpha S(0)}\right)\right\}$$

$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right).$$

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)(q^{2\alpha S(0)})\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right).$$

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)(q^{2\alpha S(0)})\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right).$$

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)\left(q^{2\alpha S(0)}\right)\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right),$$

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)(q^{2\alpha S(0)})\right\}$$

$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right)\,.$$

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)(q^{2\alpha S(0)})\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right).$$

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)(q^{2\alpha S(0)})\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right)\,.$$

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)\left(q^{2\alpha S(0)}\right)\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right),$$

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)\left(q^{2\alpha S(0)}\right)\right\}$$

$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right),$$

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)\left(q^{2\alpha S(0)}\right)\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right).$$

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)\left(q^{2\alpha S(0)}\right)\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right) .$$

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)(q^{2\alpha S(0)})\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right).$$

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)(q^{2\alpha S(0)})\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right)\,.$$

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)\left(q^{2\alpha S(0)}\right)\right\}$$

$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right).$$

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)(q^{2\alpha S(0)})\right\}$$

$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right)\,.$$

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)(q^{2\alpha S(0)})\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right)\,.$$

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)(q^{2\alpha S(0)})\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right).$$

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)(q^{2\alpha S(0)})\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right)\,.$$

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)(q^{2\alpha S(0)})\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right).$$

where

$$\rho(\eta)=\frac{T(\eta,\kappa+\alpha)}{T(\eta,\kappa)},\quad T_{\mathbf{M}}(\eta,\kappa)|\kappa\rangle=T(\eta,\kappa)|\kappa\rangle\,,$$

and $\omega_{\mathbf{n}}(\zeta,\xi)$ is defined through the TBA data in the Matsubara space.

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)(q^{2\alpha S(0)})\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right).$$

where

$$\rho(\eta)=\frac{T(\eta,\kappa+\alpha)}{T(\eta,\kappa)}, \quad T_{\mathbf{M}}(\eta,\kappa)|\kappa\rangle=T(\eta,\kappa)|\kappa\rangle,$$

and $\omega_{\mathbf{n}}(\zeta,\xi)$ is defined through the TBA data in the Matsubara space.

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)(q^{2\alpha S(0)})\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right),$$

where

$$\rho(\eta)=\frac{T(\eta,\kappa+\alpha)}{T(\eta,\kappa)},\quad T_{\mathbf{M}}(\eta,\kappa)|\kappa\rangle=T(\eta,\kappa)|\kappa\rangle,$$

and $\omega_{\mathbf{n}}(\zeta,\xi)$ is defined through the TBA data in the Matsubara space.

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)(q^{2\alpha S(0)})\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right),$$

where

$$\rho(\eta)=\frac{T(\eta,\kappa+\alpha)}{T(\eta,\kappa)},\quad T_{\mathbf{M}}(\eta,\kappa)|\kappa\rangle=T(\eta,\kappa)|\kappa\rangle\,,$$

and $\omega_{\mathbf{n}}(\zeta,\xi)$ is defined through the TBA data in the Matsubara space.

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)(q^{2\alpha S(0)})\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right).$$

where

$$\rho(\eta)=\frac{T(\eta,\kappa+\alpha)}{T(\eta,\kappa)},\quad T_{\mathbf{M}}(\eta,\kappa)|\kappa\rangle=T(\eta,\kappa)|\kappa\rangle\,.$$

and $\omega_{\mathbf{n}}(\zeta,\xi)$ is defined through the TBA data in the Matsubara space.

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)(q^{2\alpha S(0)})\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right).$$

where

$$\rho(\eta)=\frac{T(\eta,\kappa+\alpha)}{T(\eta,\kappa)},\quad T_{\mathbf{M}}(\eta,\kappa)|\kappa\rangle=T(\eta,\kappa)|\kappa\rangle\,,$$

and $\omega_{\mathbf{n}}(\zeta,\xi)$ is defined through the TBA data in the Matsubara space.

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)(q^{2\alpha S(0)})\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right)\,,$$

where

$$\rho(\eta)=\frac{T(\eta,\kappa+\alpha)}{T(\eta,\kappa)}\,,\quad T_{\mathbf{M}}(\eta,\kappa)|\kappa\rangle=T(\eta,\kappa)|\kappa\rangle\,,$$

and $\omega_{\mathbf{n}}(\zeta,\xi)$ is defined through the TBA data in the Matsubara space.

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)(q^{2\alpha S(0)})\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right),$$

where

$$\rho(\eta)=\frac{T(\eta,\kappa+\alpha)}{T(\eta,\kappa)},\quad T_{\mathbf{M}}(\eta,\kappa)|\kappa\rangle=T(\eta,\kappa)|\kappa\rangle,$$

and $\omega_{\mathbf{n}}(\zeta,\xi)$ is defined through the TBA data in the Matsubara space.

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)(q^{2\alpha S(0)})\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right),$$

where

$$\rho(\eta)=\frac{T(\eta,\kappa+\alpha)}{T(\eta,\kappa)},\quad T_{\mathbf{M}}(\eta,\kappa)|\kappa\rangle=T(\eta,\kappa)|\kappa\rangle,$$

and $\omega_{\mathbf{n}}(\zeta,\xi)$ is defined through the TBA data in the Matsubara space.

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)\left(q^{2\alpha S(0)}\right)\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right),$$

where

$$\rho(\eta)=\frac{T(\eta,\kappa+\alpha)}{T(\eta,\kappa)},\quad T_{\mathbf{M}}(\eta,\kappa)|\kappa\rangle=T(\eta,\kappa)|\kappa\rangle,$$

and $\omega_{\mathbf{n}}(\zeta,\xi)$ is defined through the TBA data in the Matsubara space.

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)(q^{2\alpha S(0)})\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right).$$

where

$$\rho(\eta)=\frac{T(\eta,\kappa+\alpha)}{T(\eta,\kappa)},\quad T_{\mathbf{M}}(\eta,\kappa)|\kappa\rangle=T(\eta,\kappa)|\kappa\rangle.$$

and $\omega_{\mathbf{n}}(\zeta,\xi)$ is defined through the TBA data in the Matsubara space.

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)(q^{2\alpha S(0)})\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right),$$

where

$$\rho(\eta)=\frac{T(\eta,\kappa+\alpha)}{T(\eta,\kappa)},\quad T_{\mathbf{M}}(\eta,\kappa)|\kappa\rangle=T(\eta,\kappa)|\kappa\rangle,$$

and $\omega_{\mathbf{n}}(\zeta,\xi)$ is defined through the TBA data in the Matsubara space.

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)(q^{2\alpha S(0)})\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right),$$

where

$$\rho(\eta)=\frac{T(\eta,\kappa+\alpha)}{T(\eta,\kappa)},\quad T_{\mathbf{M}}(\eta,\kappa)|\kappa\rangle=T(\eta,\kappa)|\kappa\rangle,$$

and $\omega_{\mathbf{n}}(\zeta,\xi)$ is defined through the TBA data in the Matsubara space.

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)(q^{2\alpha S(0)})\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right).$$

where

$$\rho(\eta)=\frac{T(\eta,\kappa+\alpha)}{T(\eta,\kappa)},\quad T_{\mathbf{M}}(\eta,\kappa)|\kappa\rangle=T(\eta,\kappa)|\kappa\rangle\,,$$

and $\omega_{\mathbf{n}}(\zeta,\xi)$ is defined through the TBA data in the Matsubara space.

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)(q^{2\alpha S(0)})\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right),$$

where

$$\rho(\eta)=\frac{T(\eta,\kappa+\alpha)}{T(\eta,\kappa)},\quad T_{\mathbf{M}}(\eta,\kappa)|\kappa\rangle=T(\eta,\kappa)|\kappa\rangle,$$

and $\omega_{\mathbf{n}}(\zeta,\xi)$ is defined through the TBA data in the Matsubara space.

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)(q^{2\alpha S(0)})\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right).$$

where

$$\rho(\eta)=\frac{T(\eta,\kappa+\alpha)}{T(\eta,\kappa)},\quad T_{\mathbf{M}}(\eta,\kappa)|\kappa\rangle=T(\eta,\kappa)|\kappa\rangle\,.$$

and $\omega_{\mathbf{n}}(\zeta,\xi)$ is defined through the TBA data in the Matsubara space.

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)(q^{2\alpha S(0)})\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right),$$

where

$$\rho(\eta)=\frac{T(\eta,\kappa+\alpha)}{T(\eta,\kappa)},\quad T_{\mathbf{M}}(\eta,\kappa)|\kappa\rangle=T(\eta,\kappa)|\kappa\rangle\,.$$

and $\omega_{\mathbf{n}}(\zeta,\xi)$ is defined through the TBA data in the Matsubara space.

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)(q^{2\alpha S(0)})\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right).$$

where

$$\rho(\eta)=\frac{T(\eta,\kappa+\alpha)}{T(\eta,\kappa)},\quad T_{\mathbf{M}}(\eta,\kappa)|\kappa\rangle=T(\eta,\kappa)|\kappa\rangle,$$

and $\omega_{\mathbf{n}}(\zeta,\xi)$ is defined through the TBA data in the Matsubara space.

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)(q^{2\alpha S(0)})\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right),$$

where

$$\rho(\eta)=\frac{T(\eta,\kappa+\alpha)}{T(\eta,\kappa)},\quad T_{\mathbf{M}}(\eta,\kappa)|\kappa\rangle=T(\eta,\kappa)|\kappa\rangle,$$

and $\omega_{\mathbf{n}}(\zeta,\xi)$ is defined through the TBA data in the Matsubara space.

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)(q^{2\alpha S(0)})\right\}$$

$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right),$$

where

$$\rho(\eta)=\frac{T(\eta,\kappa+\alpha)}{T(\eta,\kappa)},\quad T_{\mathbf{M}}(\eta,\kappa)|\kappa\rangle=T(\eta,\kappa)|\kappa\rangle,$$

and $\omega_{\mathbf{n}}(\zeta,\xi)$ is defined through the TBA data in the Matsubara space.

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)(q^{2\alpha S(0)})\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right),$$

where

$$\rho(\eta)=\frac{T(\eta,\kappa+\alpha)}{T(\eta,\kappa)},\quad T_{\mathbf{M}}(\eta,\kappa)|\kappa\rangle=T(\eta,\kappa)|\kappa\rangle,$$

and $\omega_{\mathbf{n}}(\zeta,\xi)$ is defined through the TBA data in the Matsubara space.

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)(q^{2\alpha S(0)})\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right).$$

where

$$\rho(\eta)=\frac{T(\eta,\kappa+\alpha)}{T(\eta,\kappa)},\quad T_{\mathbf{M}}(\eta,\kappa)|\kappa\rangle=T(\eta,\kappa)|\kappa\rangle\,.$$

and $\omega_{\mathbf{n}}(\zeta,\xi)$ is defined through the TBA data in the Matsubara space.

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)(q^{2\alpha S(0)})\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right).$$

where

$$\rho(\eta)=\frac{T(\eta,\kappa+\alpha)}{T(\eta,\kappa)},\quad T_{\mathbf{M}}(\eta,\kappa)|\kappa\rangle=T(\eta,\kappa)|\kappa\rangle,$$

and $\omega_{\mathbf{n}}(\zeta,\xi)$ is defined through the TBA data in the Matsubara space.

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)(q^{2\alpha S(0)})\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right).$$

where

$$\rho(\eta)=\frac{T(\eta,\kappa+\alpha)}{T(\eta,\kappa)},\quad T_{\mathbf{M}}(\eta,\kappa)|\kappa\rangle=T(\eta,\kappa)|\kappa\rangle.$$

and $\omega_{\mathbf{n}}(\zeta,\xi)$ is defined through the TBA data in the Matsubara space.

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)(q^{2\alpha S(0)})\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right),$$

where

$$\rho(\eta)=\frac{T(\eta,\kappa+\alpha)}{T(\eta,\kappa)},\quad T_{\mathbf{M}}(\eta,\kappa)|\kappa\rangle=T(\eta,\kappa)|\kappa\rangle,$$

and $\omega_{\mathbf{n}}(\zeta,\xi)$ is defined through the TBA data in the Matsubara space.

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)(q^{2\alpha S(0)})\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right),$$

where

$$\rho(\eta)=\frac{T(\eta,\kappa+\alpha)}{T(\eta,\kappa)},\quad T_{\mathbf{M}}(\eta,\kappa)|\kappa\rangle=T(\eta,\kappa)|\kappa\rangle,$$

and $\omega_{\mathbf{n}}(\zeta,\xi)$ is defined through the TBA data in the Matsubara space.

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)(q^{2\alpha S(0)})\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right).$$

where

$$\rho(\eta)=\frac{T(\eta,\kappa+\alpha)}{T(\eta,\kappa)},\quad T_{\mathbf{M}}(\eta,\kappa)|\kappa\rangle=T(\eta,\kappa)|\kappa\rangle\,,$$

and $\omega_{\mathbf{n}}(\zeta,\xi)$ is defined through the TBA data in the Matsubara space.

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)(q^{2\alpha S(0)})\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right).$$

where

$$\rho(\eta)=\frac{T(\eta,\kappa+\alpha)}{T(\eta,\kappa)},\quad T_{\mathbf{M}}(\eta,\kappa)|\kappa\rangle=T(\eta,\kappa)|\kappa\rangle\,.$$

and $\omega_{\mathbf{n}}(\zeta,\xi)$ is defined through the TBA data in the Matsubara space.

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)(q^{2\alpha S(0)})\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right).$$

where

$$\rho(\eta)=\frac{T(\eta,\kappa+\alpha)}{T(\eta,\kappa)},\quad T_{\mathbf{M}}(\eta,\kappa)|\kappa\rangle=T(\eta,\kappa)|\kappa\rangle,$$

and $\omega_{\mathbf{n}}(\zeta,\xi)$ is defined through the TBA data in the Matsubara space.

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)(q^{2\alpha S(0)})\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right),$$

where

$$\rho(\eta)=\frac{T(\eta,\kappa+\alpha)}{T(\eta,\kappa)},\quad T_{\mathbf{M}}(\eta,\kappa)|\kappa\rangle=T(\eta,\kappa)|\kappa\rangle,$$

and $\omega_{\mathbf{n}}(\zeta,\xi)$ is defined through the TBA data in the Matsubara space.

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)(q^{2\alpha S(0)})\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right),$$

where

$$\rho(\eta)=\frac{T(\eta,\kappa+\alpha)}{T(\eta,\kappa)},\quad T_{\mathbf{M}}(\eta,\kappa)|\kappa\rangle=T(\eta,\kappa)|\kappa\rangle,$$

and $\omega_{\mathbf{n}}(\zeta,\xi)$ is defined through the TBA data in the Matsubara space.

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)(q^{2\alpha S(0)})\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right).$$

where

$$\rho(\eta)=\frac{T(\eta,\kappa+\alpha)}{T(\eta,\kappa)},\quad T_{\mathbf{M}}(\eta,\kappa)|\kappa\rangle=T(\eta,\kappa)|\kappa\rangle\,.$$

and $\omega_{\mathbf{n}}(\zeta,\xi)$ is defined through the TBA data in the Matsubara space.

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)(q^{2\alpha S(0)})\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right)\,.$$

where

$$\rho(\eta)=\frac{T(\eta,\kappa+\alpha)}{T(\eta,\kappa)}\,,\quad T_{\mathbf{M}}(\eta,\kappa)|\kappa\rangle=T(\eta,\kappa)|\kappa\rangle\,,$$

and $\omega_{\mathbf{n}}(\zeta,\xi)$ is defined through the TBA data in the Matsubara space.

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)(q^{2\alpha S(0)})\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right).$$

where

$$\rho(\eta)=\frac{T(\eta,\kappa+\alpha)}{T(\eta,\kappa)}, \quad T_{\mathbf{M}}(\eta,\kappa)|\kappa\rangle=T(\eta,\kappa)|\kappa\rangle.$$

and $\omega_{\mathbf{n}}(\zeta,\xi)$ is defined through the TBA data in the Matsubara space.

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)(q^{2\alpha S(0)})\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right).$$

where

$$\rho(\eta)=\frac{T(\eta,\kappa+\alpha)}{T(\eta,\kappa)},\quad T_{\mathbf{M}}(\eta,\kappa)|\kappa\rangle=T(\eta,\kappa)|\kappa\rangle\,.$$

and $\omega_{\mathbf{n}}(\zeta,\xi)$ is defined through the TBA data in the Matsubara space.

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)(q^{2\alpha S(0)})\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right).$$

where

$$\rho(\eta)=\frac{T(\eta,\kappa+\alpha)}{T(\eta,\kappa)},\quad T_{\mathbf{M}}(\eta,\kappa)|\kappa\rangle=T(\eta,\kappa)|\kappa\rangle,$$

and $\omega_{\mathbf{n}}(\zeta,\xi)$ is defined through the TBA data in the Matsubara space.

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)(q^{2\alpha S(0)})\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right).$$

where

$$\rho(\eta)=\frac{T(\eta,\kappa+\alpha)}{T(\eta,\kappa)},\quad T_{\mathbf{M}}(\eta,\kappa)|\kappa\rangle=T(\eta,\kappa)|\kappa\rangle.$$

and $\omega_{\mathbf{n}}(\zeta,\xi)$ is defined through the TBA data in the Matsubara space.

TBA data

TBA data

- auxiliary function characterizing $|\kappa\rangle$

$$\log \mathfrak{a}(\zeta,\kappa) = -2\pi i\nu\kappa + \log\frac{a(\zeta)}{d(\zeta)} - \int_\gamma K_0(\zeta/\xi)\log(1+\mathfrak{a}(\xi,\kappa))\frac{d\xi^2}{\xi^2},$$

where γ encircles the Bethe roots clockwise, and

$$a(\zeta) = (1-q\zeta^2)^{\mathbf{n}}, \quad d(\zeta) = (1-q^{-1}\zeta^2)^{\mathbf{n}},$$

$$K_\alpha(\zeta) = \Delta_\zeta\psi(\zeta,\alpha), \quad \psi(\zeta,\alpha) = \frac{\zeta^\alpha}{\zeta^2-1},$$

$$\Delta_\zeta f(\zeta) = f(q\zeta) - f(q^{-1}\zeta).$$

TBA data

- auxiliary function characterizing $|\kappa\rangle$

$$\log \mathfrak{a}(\zeta,\kappa) = -2\pi i\nu\kappa + \log\frac{a(\zeta)}{d(\zeta)} - \int_\gamma K_0(\zeta/\xi)\log(1+\mathfrak{a}(\xi,\kappa))\frac{d\xi^2}{\xi^2},$$

where γ encircles the Bethe roots clockwise, and

$$a(\zeta) = (1-q\zeta^2)^{\mathbf{n}}, \quad d(\zeta) = (1-q^{-1}\zeta^2)^{\mathbf{n}},$$

$$K_\alpha(\zeta) = \Delta_\zeta\psi(\zeta,\alpha), \quad \psi(\zeta,\alpha) = \frac{\zeta^\alpha}{\zeta^2-1},$$

$$\Delta_\zeta f(\zeta) = f(q\zeta) - f(q^{-1}\zeta).$$

TBA data

- auxiliary function characterizing $|\kappa\rangle$

$$\log \mathfrak{a}(\zeta,\kappa) = -2\pi i \nu\kappa + \log\frac{a(\zeta)}{d(\zeta)} - \int_\gamma K_0(\zeta/\xi)\log(1+\mathfrak{a}(\xi,\kappa))\frac{d\xi^2}{\xi^2},$$

where γ encircles the Bethe roots clockwise, and

$$a(\zeta) = (1-q\zeta^2)^{\mathbf{n}}, \quad d(\zeta) = (1-q^{-1}\zeta^2)^{\mathbf{n}},$$

$$K_\alpha(\zeta) = \Delta_\zeta\psi(\zeta,\alpha), \quad \psi(\zeta,\alpha) = \frac{\zeta^\alpha}{\zeta^2-1},$$

$$\Delta_\zeta f(\zeta) = f(q\zeta) - f(q^{-1}\zeta).$$

TBA data

- auxiliary function characterizing $|\kappa\rangle$

$$\log \mathfrak{a}(\zeta,\kappa) = -2\pi i\nu\kappa + \log\frac{a(\zeta)}{d(\zeta)} - \int_\gamma K_0(\zeta/\xi)\log(1+\mathfrak{a}(\xi,\kappa))\frac{d\xi^2}{\xi^2},$$

where γ encircles the Bethe roots clockwise, and

$$a(\zeta) = (1-q\zeta^2)^{\mathbf{n}}, \quad d(\zeta) = (1-q^{-1}\zeta^2)^{\mathbf{n}},$$

$$K_\alpha(\zeta) = \Delta_\zeta\psi(\zeta,\alpha), \quad \psi(\zeta,\alpha) = \frac{\zeta^\alpha}{\zeta^2-1},$$

$$\Delta_\zeta f(\zeta) = f(q\zeta) - f(q^{-1}\zeta).$$

TBA data

- auxiliary function characterizing $|\kappa\rangle$

$$\log \mathfrak{a}(\zeta,\kappa) = -2\pi i \nu\kappa + \log\frac{a(\zeta)}{d(\zeta)} - \int_{\gamma} K_0(\zeta/\xi)\log(1+\mathfrak{a}(\xi,\kappa))\frac{d\xi^2}{\xi^2},$$

where γ encircles the Bethe roots clockwise, and

$$a(\zeta) = (1-q\zeta^2)^{\mathbf{n}}, \quad d(\zeta) = (1-q^{-1}\zeta^2)^{\mathbf{n}},$$

$$K_\alpha(\zeta) = \Delta_\zeta \psi(\zeta,\alpha), \quad \psi(\zeta,\alpha) = \frac{\zeta^\alpha}{\zeta^2-1},$$

$$\Delta_\zeta f(\zeta) = f(q\zeta) - f(q^{-1}\zeta).$$

TBA data

- auxiliary function characterizing $|\kappa\rangle$

$$\log \mathfrak{a}(\zeta,\kappa) = -2\pi i\nu\kappa + \log\frac{a(\zeta)}{d(\zeta)} - \int_\gamma K_0(\zeta/\xi)\log(1+\mathfrak{a}(\xi,\kappa))\frac{d\xi^2}{\xi^2},$$

where γ encircles the Bethe roots clockwise, and

$$a(\zeta) = (1-q\zeta^2)^{\mathbf{n}}, \quad d(\zeta) = (1-q^{-1}\zeta^2)^{\mathbf{n}},$$

$$K_\alpha(\zeta) = \Delta_\zeta\psi(\zeta,\alpha), \quad \psi(\zeta,\alpha) = \frac{\zeta^\alpha}{\zeta^2-1},$$

$$\Delta_\zeta f(\zeta) = f(q\zeta) - f(q^{-1}\zeta).$$

TBA data

- auxiliary function characterizing $|\kappa\rangle$

$$\log \mathfrak{a}(\zeta,\kappa) = -2\pi i\nu\kappa + \log\frac{a(\zeta)}{d(\zeta)} - \int_\gamma K_0(\zeta/\xi)\log(1+\mathfrak{a}(\xi,\kappa))\frac{d\xi^2}{\xi^2},$$

where γ encircles the Bethe roots clockwise, and

$$a(\zeta) = (1-q\zeta^2)^{\mathbf{n}}, \quad d(\zeta) = (1-q^{-1}\zeta^2)^{\mathbf{n}},$$

$$K_\alpha(\zeta) = \Delta_\zeta\psi(\zeta,\alpha), \quad \psi(\zeta,\alpha) = \frac{\zeta^\alpha}{\zeta^2-1},$$

$$\Delta_\zeta f(\zeta) = f(q\zeta) - f(q^{-1}\zeta).$$

TBA data

- auxiliary function characterizing $|\kappa\rangle$

$$\log \mathfrak{a}(\zeta,\kappa) = -2\pi i \nu\kappa + \log\frac{a(\zeta)}{d(\zeta)} - \int_{\gamma} K_0(\zeta/\xi)\log(1+\mathfrak{a}(\xi,\kappa))\frac{d\xi^2}{\xi^2},$$

where γ encircles the Bethe roots clockwise, and

$$a(\zeta) = (1-q\zeta^2)^{\mathbf{n}}, \quad d(\zeta) = (1-q^{-1}\zeta^2)^{\mathbf{n}},$$

$$K_\alpha(\zeta) = \Delta_\zeta \psi(\zeta,\alpha), \quad \psi(\zeta,\alpha) = \frac{\zeta^\alpha}{\zeta^2-1},$$

$$\Delta_\zeta f(\zeta) = f(q\zeta) - f(q^{-1}\zeta).$$

TBA data

- auxiliary function characterizing $|\kappa\rangle$

$$\log \mathfrak{a}(\zeta,\kappa) = -2\pi i\nu\kappa + \log\frac{a(\zeta)}{d(\zeta)} - \int_\gamma K_0(\zeta/\xi)\log(1+\mathfrak{a}(\xi,\kappa))\frac{d\xi^2}{\xi^2}\,,$$

where γ encircles the Bethe roots clockwise, and

$$a(\zeta) = (1-q\zeta^2)^{\mathbf{n}}\,,\quad d(\zeta) = (1-q^{-1}\zeta^2)^{\mathbf{n}}\,,$$

$$K_\alpha(\zeta) = \Delta_\zeta\psi(\zeta,\alpha)\,,\quad \psi(\zeta,\alpha) = \frac{\zeta^\alpha}{\zeta^2-1}\,,$$

$$\Delta_\zeta f(\zeta) = f(q\zeta) - f(q^{-1}\zeta)\,.$$

TBA data

- auxiliary function characterizing $|\kappa\rangle$

$$\log \mathfrak{a}(\zeta,\kappa) = -2\pi i\nu\kappa + \log\frac{a(\zeta)}{d(\zeta)} - \int_\gamma K_0(\zeta/\xi)\log(1+\mathfrak{a}(\xi,\kappa))\frac{d\xi^2}{\xi^2},$$

where γ encircles the Bethe roots clockwise, and

$$a(\zeta) = (1-q\zeta^2)^{\mathbf{n}}, \quad d(\zeta) = (1-q^{-1}\zeta^2)^{\mathbf{n}},$$
$$K_\alpha(\zeta) = \Delta_\zeta\psi(\zeta,\alpha), \quad \psi(\zeta,\alpha) = \frac{\zeta^\alpha}{\zeta^2-1},$$
$$\Delta_\zeta f(\zeta) = f(q\zeta) - f(q^{-1}\zeta).$$

TBA data

- auxiliary function characterizing $|\kappa\rangle$

$$\log \mathfrak{a}(\zeta,\kappa) = -2\pi i\nu\kappa + \log\frac{a(\zeta)}{d(\zeta)} - \int_\gamma K_0(\zeta/\xi)\log(1+\mathfrak{a}(\xi,\kappa))\frac{d\xi^2}{\xi^2},$$

where γ encircles the Bethe roots clockwise, and

$$a(\zeta) = (1-q\zeta^2)^{\mathbf{n}}, \quad d(\zeta) = (1-q^{-1}\zeta^2)^{\mathbf{n}},$$

$$K_\alpha(\zeta) = \Delta_\zeta\psi(\zeta,\alpha), \quad \psi(\zeta,\alpha) = \frac{\zeta^\alpha}{\zeta^2-1},$$

$$\Delta_\zeta f(\zeta) = f(q\zeta) - f(q^{-1}\zeta).$$

TBA data

- auxiliary function characterizing $|\kappa\rangle$

$$\log \mathfrak{a}(\zeta,\kappa) = -2\pi i\nu\kappa + \log\frac{a(\zeta)}{d(\zeta)} - \int_\gamma K_0(\zeta/\xi)\log(1+\mathfrak{a}(\xi,\kappa))\frac{d\xi^2}{\xi^2},$$

where γ encircles the Bethe roots clockwise, and

$$a(\zeta) = (1-q\zeta^2)^{\mathbf{n}}, \quad d(\zeta) = (1-q^{-1}\zeta^2)^{\mathbf{n}},$$

$$K_\alpha(\zeta) = \Delta_\zeta\psi(\zeta,\alpha), \quad \psi(\zeta,\alpha) = \frac{\zeta^\alpha}{\zeta^2-1},$$

$$\Delta_\zeta f(\zeta) = f(q\zeta) - f(q^{-1}\zeta).$$

TBA data

- auxiliary function characterizing $|\kappa\rangle$

$$\log \mathfrak{a}(\zeta,\kappa) = -2\pi i\nu\kappa + \log \frac{a(\zeta)}{d(\zeta)} - \int_\gamma K_0(\zeta/\xi)\log(1+\mathfrak{a}(\xi,\kappa))\frac{d\xi^2}{\xi^2},$$

where γ encircles the Bethe roots clockwise, and

$$a(\zeta) = (1-q\zeta^2)^{\mathbf{n}}, \quad d(\zeta) = (1-q^{-1}\zeta^2)^{\mathbf{n}},$$
$$K_\alpha(\zeta) = \Delta_\zeta\psi(\zeta,\alpha), \quad \psi(\zeta,\alpha) = \frac{\zeta^\alpha}{\zeta^2-1},$$
$$\Delta_\zeta f(\zeta) = f(q\zeta) - f(q^{-1}\zeta).$$

TBA data

- auxiliary function characterizing $|\kappa\rangle$

$$\log \mathfrak{a}(\zeta,\kappa) = -2\pi i\nu\kappa + \log\frac{a(\zeta)}{d(\zeta)} - \int_\gamma K_0(\zeta/\xi)\log(1+\mathfrak{a}(\xi,\kappa))\frac{d\xi^2}{\xi^2},$$

where γ encircles the Bethe roots clockwise, and

$$a(\zeta) = (1-q\zeta^2)^{\mathbf{n}}, \quad d(\zeta) = (1-q^{-1}\zeta^2)^{\mathbf{n}},$$

$$K_\alpha(\zeta) = \Delta_\zeta\psi(\zeta,\alpha), \quad \psi(\zeta,\alpha) = \frac{\zeta^\alpha}{\zeta^2-1},$$

$$\Delta_\zeta f(\zeta) = f(q\zeta) - f(q^{-1}\zeta).$$

TBA data

- auxiliary function characterizing $|\kappa\rangle$

$$\log \mathfrak{a}(\zeta,\kappa) = -2\pi i\nu\kappa + \log\frac{a(\zeta)}{d(\zeta)} - \int_\gamma K_0(\zeta/\xi)\log(1+\mathfrak{a}(\xi,\kappa))\frac{d\xi^2}{\xi^2},$$

where γ encircles the Bethe roots clockwise, and

$$a(\zeta) = (1-q\zeta^2)^{\mathbf{n}}, \quad d(\zeta) = (1-q^{-1}\zeta^2)^{\mathbf{n}},$$

$$K_\alpha(\zeta) = \Delta_\zeta\psi(\zeta,\alpha), \quad \psi(\zeta,\alpha) = \frac{\zeta^\alpha}{\zeta^2-1},$$

$$\Delta_\zeta f(\zeta) = f(q\zeta) - f(q^{-1}\zeta).$$

TBA data

- auxiliary function characterizing $|\kappa\rangle$

$$\log \mathfrak{a}(\zeta,\kappa) = -2\pi i\nu\kappa + \log\frac{a(\zeta)}{d(\zeta)} - \int_\gamma K_0(\zeta/\xi)\log(1+\mathfrak{a}(\xi,\kappa))\frac{d\xi^2}{\xi^2},$$

where γ encircles the Bethe roots clockwise, and

$$a(\zeta) = (1-q\zeta^2)^{\mathbf{n}}, \quad d(\zeta) = (1-q^{-1}\zeta^2)^{\mathbf{n}},$$

$$K_\alpha(\zeta) = \Delta_\zeta\psi(\zeta,\alpha), \quad \psi(\zeta,\alpha) = \frac{\zeta^\alpha}{\zeta^2-1},$$

$$\Delta_\zeta f(\zeta) = f(q\zeta) - f(q^{-1}\zeta).$$

TBA data

- auxiliary function characterizing $|\kappa\rangle$

$$\log \mathfrak{a}(\zeta,\kappa) = -2\pi i\nu\kappa + \log\frac{a(\zeta)}{d(\zeta)} - \int_\gamma K_0(\zeta/\xi)\log(1+\mathfrak{a}(\xi,\kappa))\frac{d\xi^2}{\xi^2},$$

where γ encircles the Bethe roots clockwise, and

$$a(\zeta) = (1-q\zeta^2)^{\mathbf{n}}, \quad d(\zeta) = (1-q^{-1}\zeta^2)^{\mathbf{n}},$$

$$K_\alpha(\zeta) = \Delta_\zeta\psi(\zeta,\alpha), \quad \psi(\zeta,\alpha) = \frac{\zeta^\alpha}{\zeta^2-1},$$

$$\Delta_\zeta f(\zeta) = f(q\zeta) - f(q^{-1}\zeta).$$

TBA data

- auxiliary function characterizing $|\kappa\rangle$

$$\log \mathfrak{a}(\zeta,\kappa) = -2\pi i\nu\kappa + \log\frac{a(\zeta)}{d(\zeta)} - \int_\gamma K_0(\zeta/\xi)\log(1+\mathfrak{a}(\xi,\kappa))\frac{d\xi^2}{\xi^2},$$

where γ encircles the Bethe roots clockwise, and

$$a(\zeta) = (1-q\zeta^2)^{\mathbf{n}}, \quad d(\zeta) = (1-q^{-1}\zeta^2)^{\mathbf{n}},$$

$$K_\alpha(\zeta) = \Delta_\zeta\psi(\zeta,\alpha), \quad \psi(\zeta,\alpha) = \frac{\zeta^\alpha}{\zeta^2-1},$$

$$\Delta_\zeta f(\zeta) = f(q\zeta) - f(q^{-1}\zeta).$$

TBA data

- auxiliary function characterizing $|\kappa\rangle$

$$\log \mathfrak{a}(\zeta,\kappa) = -2\pi i\nu\kappa + \log\frac{a(\zeta)}{d(\zeta)} - \int_\gamma K_0(\zeta/\xi)\log(1+\mathfrak{a}(\xi,\kappa))\frac{d\xi^2}{\xi^2},$$

where γ encircles the Bethe roots clockwise, and

$$a(\zeta) = (1-q\zeta^2)^{\mathbf{n}}, \quad d(\zeta) = (1-q^{-1}\zeta^2)^{\mathbf{n}},$$

$$K_\alpha(\zeta) = \Delta_\zeta\psi(\zeta,\alpha), \quad \psi(\zeta,\alpha) = \frac{\zeta^\alpha}{\zeta^2-1},$$

$$\Delta_\zeta f(\zeta) = f(q\zeta) - f(q^{-1}\zeta).$$

TBA data

- auxiliary function characterizing $|\kappa\rangle$

$$\log \mathfrak{a}(\zeta,\kappa) = -2\pi i\nu\kappa + \log\frac{a(\zeta)}{d(\zeta)} - \int_\gamma K_0(\zeta/\xi)\log(1+\mathfrak{a}(\xi,\kappa))\frac{d\xi^2}{\xi^2},$$

where γ encircles the Bethe roots clockwise, and

$$a(\zeta) = (1-q\zeta^2)^{\mathbf{n}}, \quad d(\zeta) = (1-q^{-1}\zeta^2)^{\mathbf{n}},$$

$$K_\alpha(\zeta) = \Delta_\zeta\psi(\zeta,\alpha), \quad \psi(\zeta,\alpha) = \frac{\zeta^\alpha}{\zeta^2-1},$$

$$\Delta_\zeta f(\zeta) = f(q\zeta) - f(q^{-1}\zeta).$$

TBA data

- auxiliary function characterizing $|\kappa\rangle$

$$\log \mathfrak{a}(\zeta,\kappa) = -2\pi i \nu\kappa + \log \frac{a(\zeta)}{d(\zeta)} - \int_\gamma K_0(\zeta/\xi) \log(1+\mathfrak{a}(\xi,\kappa)) \frac{d\xi^2}{\xi^2},$$

where γ encircles the Bethe roots clockwise, and

$$a(\zeta) = (1-q\zeta^2)^{\mathbf{n}}, \quad d(\zeta) = (1-q^{-1}\zeta^2)^{\mathbf{n}},$$

$$K_\alpha(\zeta) = \Delta_\zeta \psi(\zeta,\alpha), \quad \psi(\zeta,\alpha) = \frac{\zeta^\alpha}{\zeta^2-1},$$

$$\Delta_\zeta f(\zeta) = f(q\zeta) - f(q^{-1}\zeta).$$

- resolvent

$$\mathcal{R}_{\mathrm{dress}} - \mathcal{R}_{\mathrm{dress}} \star K_\alpha = K_\alpha ,$$

$$f \star g(\zeta,\xi) = \int_\gamma f(\zeta,\eta) g(\eta,\xi) \frac{1}{1+\mathfrak{a}(\eta,\kappa)} \frac{1}{\rho(\eta)} \frac{d\eta^2}{\eta^2} .$$

- resolvent

$$\mathcal{R}_{\mathrm{dress}} - \mathcal{R}_{\mathrm{dress}} \star K_\alpha = K_\alpha ,$$

$$f \star g(\zeta, \xi) = \int_\gamma f(\zeta, \eta) g(\eta, \xi) \frac{1}{1 + \mathfrak{a}(\eta, \kappa)} \frac{1}{\rho(\eta)} \frac{d\eta^2}{\eta^2} .$$

- resolvent

$$\mathcal{R}_{\rm dress} - \mathcal{R}_{\rm dress} \star K_\alpha = K_\alpha ,$$

$$f \star g(\zeta,\xi) = \int_\gamma f(\zeta,\eta) g(\eta,\xi) \frac{1}{1+\mathfrak{a}(\eta,\kappa)} \frac{1}{\rho(\eta)} \frac{d\eta^2}{\eta^2} .$$

- formula for $\omega_{\mathbf{n}}$ is

$$\frac{1}{4}\omega_{\mathbf{n}}(\zeta,\xi) = f_{\rm left} \star (I + \mathcal{R}_{\rm dress}) \star f_{\rm right}(\zeta,\xi) - \omega_0(\zeta,\xi) ,$$

where

$$f_{\rm left}(\zeta,\xi) = \frac{1}{2\pi i}\delta^-_\zeta \psi(\zeta/\xi,\alpha) , \quad f_{\rm right}(\zeta,\xi) = \delta^-_\xi \psi(\zeta/\xi,\alpha) ,$$

$$\delta^-_\zeta f(\zeta) = f(q\zeta) - \rho(\zeta) f(\zeta) ,$$

$$\omega_0(\zeta,\xi) = -\delta^-_\zeta \delta^-_\xi \Delta^{-1}_\zeta \psi(\zeta/\xi,\alpha) .$$

- resolvent

$$\mathcal{R}_{\rm dress} - \mathcal{R}_{\rm dress} \star K_\alpha = K_\alpha \,,$$

$$f \star g(\zeta,\xi) = \int_\gamma f(\zeta,\eta) g(\eta,\xi) \frac{1}{1+\mathfrak{a}(\eta,\kappa)} \frac{1}{\rho(\eta)} \frac{d\eta^2}{\eta^2} \,.$$

- formula for $\omega_{\mathbf{n}}$ is

$$\frac{1}{4}\omega_{\mathbf{n}}(\zeta,\xi) = f_{\rm left} \star (I + \mathcal{R}_{\rm dress}) \star f_{\rm right}(\zeta,\xi) - \omega_0(\zeta,\xi) \,,$$

where

$$f_{\rm left}(\zeta,\xi) = \frac{1}{2\pi i}\delta^-_\zeta \psi(\zeta/\xi,\alpha) \,, \quad f_{\rm right}(\zeta,\xi) = \delta^-_\xi \psi(\zeta/\xi,\alpha) \,,$$

$$\delta^-_\zeta f(\zeta) = f(q\zeta) - \rho(\zeta) f(\zeta) \,,$$

$$\omega_0(\zeta,\xi) = -\delta^-_\zeta \delta^-_\xi \Delta^{-1}_\zeta \psi(\zeta/\xi,\alpha) \,.$$

- resolvent

$$\mathcal{R}_{\rm dress} - \mathcal{R}_{\rm dress} \star K_\alpha = K_\alpha \,,$$
$$f \star g(\zeta,\xi) = \int_\gamma f(\zeta,\eta) g(\eta,\xi) \frac{1}{1+\mathfrak{a}(\eta,\kappa)} \frac{1}{\rho(\eta)} \frac{d\eta^2}{\eta^2} \,.$$

- formula for $\omega_{\mathbf{n}}$ is

$$\frac{1}{4}\omega_{\mathbf{n}}(\zeta,\xi) = f_{\rm left} \star (I + \mathcal{R}_{\rm dress}) \star f_{\rm right}(\zeta,\xi) - \omega_0(\zeta,\xi) \,.$$

where

$$f_{\rm left}(\zeta,\xi) = \frac{1}{2\pi i}\delta^-_\zeta \psi(\zeta/\xi,\alpha) \,, \quad f_{\rm right}(\zeta,\xi) = \delta^-_\xi \psi(\zeta/\xi,\alpha) \,,$$
$$\delta^-_\zeta f(\zeta) = f(q\zeta) - \rho(\zeta) f(\zeta) \,,$$
$$\omega_0(\zeta,\xi) = -\delta^-_\zeta \delta^-_\xi \Delta^{-1}_\zeta \psi(\zeta/\xi,\alpha) \,.$$

- resolvent

$$\mathcal{R}_{\mathrm{dress}} - \mathcal{R}_{\mathrm{dress}} \star K_\alpha = K_\alpha ,$$

$$f \star g(\zeta,\xi) = \int_\gamma f(\zeta,\eta) g(\eta,\xi) \frac{1}{1+\mathfrak{a}(\eta,\kappa)} \frac{1}{\rho(\eta)} \frac{d\eta^2}{\eta^2} .$$

- formula for $\omega_{\mathbf{n}}$ is

$$\frac{1}{4}\omega_{\mathbf{n}}(\zeta,\xi) = f_{\mathrm{left}} \star (I + \mathcal{R}_{\mathrm{dress}}) \star f_{\mathrm{right}}(\zeta,\xi) - \omega_0(\zeta,\xi) ,$$

where

$$f_{\mathrm{left}}(\zeta,\xi) = \frac{1}{2\pi i}\delta^-_\zeta \psi(\zeta/\xi,\alpha) , \quad f_{\mathrm{right}}(\zeta,\xi) = \delta^-_\xi \psi(\zeta/\xi,\alpha) ,$$

$$\delta^-_\zeta f(\zeta) = f(q\zeta) - \rho(\zeta) f(\zeta) ,$$

$$\omega_0(\zeta,\xi) = -\delta^-_\zeta \delta^-_\xi \Delta^{-1}_\zeta \psi(\zeta/\xi,\alpha) .$$

- resolvent

$$\mathcal{R}_{\mathrm{dress}} - \mathcal{R}_{\mathrm{dress}} \star K_\alpha = K_\alpha\,,$$

$$f \star g(\zeta,\xi) = \int_\gamma f(\zeta,\eta) g(\eta,\xi) \frac{1}{1+\mathfrak{a}(\eta,\kappa)} \frac{1}{\rho(\eta)} \frac{d\eta^2}{\eta^2}\,.$$

- formula for $\omega_{\mathbf{n}}$ is

$$\frac{1}{4}\omega_{\mathbf{n}}(\zeta,\xi) = f_{\mathrm{left}} \star (I + \mathcal{R}_{\mathrm{dress}}) \star f_{\mathrm{right}}(\zeta,\xi) - \omega_0(\zeta,\xi)\,,$$

where

$$f_{\mathrm{left}}(\zeta,\xi) = \frac{1}{2\pi i}\delta^-_\zeta \psi(\zeta/\xi,\alpha)\,, \quad f_{\mathrm{right}}(\zeta,\xi) = \delta^-_\xi \psi(\zeta/\xi,\alpha)\,,$$

$$\delta^-_\zeta f(\zeta) = f(q\zeta) - \rho(\zeta) f(\zeta)\,,$$

$$\omega_0(\zeta,\xi) = -\delta^-_\zeta \delta^-_\xi \Delta^{-1}_\zeta \psi(\zeta/\xi,\alpha)\,.$$

- resolvent

$$\mathcal{R}_{\mathrm{dress}} - \mathcal{R}_{\mathrm{dress}} \star K_\alpha = K_\alpha ,$$

$$f \star g(\zeta, \xi) = \int_\gamma f(\zeta, \eta) g(\eta, \xi) \frac{1}{1 + \mathfrak{a}(\eta, \kappa)} \frac{1}{\rho(\eta)} \frac{d\eta^2}{\eta^2} .$$

- formula for $\omega_{\mathbf{n}}$ is

$$\frac{1}{4}\omega_{\mathbf{n}}(\zeta, \xi) = f_{\mathrm{left}} \star (I + \mathcal{R}_{\mathrm{dress}}) \star f_{\mathrm{right}}(\zeta, \xi) - \omega_0(\zeta, \xi) ,$$

where

$$f_{\mathrm{left}}(\zeta, \xi) = \frac{1}{2\pi i} \delta^-_\zeta \psi(\zeta/\xi, \alpha) , \quad f_{\mathrm{right}}(\zeta, \xi) = \delta^-_\xi \psi(\zeta/\xi, \alpha) ,$$

$$\delta^-_\zeta f(\zeta) = f(q\zeta) - \rho(\zeta) f(\zeta) ,$$

$$\omega_0(\zeta, \xi) = -\delta^-_\zeta \delta^-_\xi \Delta^{-1}_\zeta \psi(\zeta/\xi, \alpha) .$$

- resolvent

$$\mathcal{R}_{\rm dress} - \mathcal{R}_{\rm dress} \star K_\alpha = K_\alpha \,,$$

$$f \star g(\zeta,\xi) = \int_\gamma f(\zeta,\eta) g(\eta,\xi) \frac{1}{1+\mathfrak{a}(\eta,\kappa)} \frac{1}{\rho(\eta)} \frac{d\eta^2}{\eta^2} \,.$$

- formula for $\omega_{\mathbf{n}}$ is

$$\frac{1}{4}\omega_{\mathbf{n}}(\zeta,\xi) = f_{\rm left} \star (I + \mathcal{R}_{\rm dress}) \star f_{\rm right}(\zeta,\xi) - \omega_0(\zeta,\xi) \,,$$

where

$$f_{\rm left}(\zeta,\xi) = \frac{1}{2\pi i}\delta^-_\zeta \psi(\zeta/\xi,\alpha) \,, \quad f_{\rm right}(\zeta,\xi) = \delta^-_\xi \psi(\zeta/\xi,\alpha) \,,$$

$$\delta^-_\zeta f(\zeta) = f(q\zeta) - \rho(\zeta) f(\zeta) \,,$$

$$\omega_0(\zeta,\xi) = -\delta^-_\zeta \delta^-_\xi \Delta^{-1}_\zeta \psi(\zeta/\xi,\alpha) \,.$$

- resolvent

$$\mathcal{R}_{\mathrm{dress}} - \mathcal{R}_{\mathrm{dress}} \star K_\alpha = K_\alpha ,$$
$$f \star g(\zeta, \xi) = \int_\gamma f(\zeta, \eta) g(\eta, \xi) \frac{1}{1 + \mathfrak{a}(\eta, \kappa)} \frac{1}{\rho(\eta)} \frac{d\eta^2}{\eta^2} .$$

- formula for $\omega_{\mathbf{n}}$ is

$$\frac{1}{4}\omega_{\mathbf{n}}(\zeta, \xi) = f_{\mathrm{left}} \star (I + \mathcal{R}_{\mathrm{dress}}) \star f_{\mathrm{right}}(\zeta, \xi) - \omega_0(\zeta, \xi) ,$$

where

$$f_{\mathrm{left}}(\zeta, \xi) = \frac{1}{2\pi i} \delta^-_\zeta \psi(\zeta/\xi, \alpha) , \quad f_{\mathrm{right}}(\zeta, \xi) = \delta^-_\xi \psi(\zeta/\xi, \alpha) ,$$
$$\delta^-_\zeta f(\zeta) = f(q\zeta) - \rho(\zeta) f(\zeta) ,$$
$$\omega_0(\zeta, \xi) = -\delta^-_\zeta \delta^-_\xi \Delta^{-1}_\zeta \psi(\zeta/\xi, \alpha) .$$

- resolvent

$$\mathcal{R}_{\rm dress} - \mathcal{R}_{\rm dress} \star K_\alpha = K_\alpha \,,$$

$$f \star g(\zeta, \xi) = \int_\gamma f(\zeta, \eta) g(\eta, \xi) \frac{1}{1 + \mathfrak{a}(\eta, \kappa)} \frac{1}{\rho(\eta)} \frac{d\eta^2}{\eta^2} \,.$$

- formula for $\omega_{\mathbf{n}}$ is

$$\frac{1}{4}\omega_{\mathbf{n}}(\zeta, \xi) = f_{\rm left} \star (I + \mathcal{R}_{\rm dress}) \star f_{\rm right}(\zeta, \xi) - \omega_0(\zeta, \xi) \,.$$

where

$$f_{\rm left}(\zeta, \xi) = \frac{1}{2\pi i} \delta^-_\zeta \psi(\zeta/\xi, \alpha) \,, \quad f_{\rm right}(\zeta, \xi) = \delta^-_\xi \psi(\zeta/\xi, \alpha) \,,$$

$$\delta^-_\zeta f(\zeta) = f(q\zeta) - \rho(\zeta) f(\zeta) \,,$$

$$\omega_0(\zeta, \xi) = -\delta^-_\zeta \delta^-_\xi \Delta^{-1}_\zeta \psi(\zeta/\xi, \alpha) \,.$$

- resolvent

$$\mathcal{R}_{\text{dress}} - \mathcal{R}_{\text{dress}} \star K_\alpha = K_\alpha \,,$$

$$f \star g(\zeta, \xi) = \int_\gamma f(\zeta, \eta) g(\eta, \xi) \frac{1}{1 + \mathfrak{a}(\eta, \kappa)} \frac{1}{\rho(\eta)} \frac{d\eta^2}{\eta^2} \,.$$

- formula for $\omega_{\mathbf{n}}$ is

$$\frac{1}{4}\omega_{\mathbf{n}}(\zeta, \xi) = f_{\text{left}} \star (I + \mathcal{R}_{\text{dress}}) \star f_{\text{right}}(\zeta, \xi) - \omega_0(\zeta, \xi) \,,$$

where

$$f_{\text{left}}(\zeta, \xi) = \frac{1}{2\pi i} \delta^-_\zeta \psi(\zeta/\xi, \alpha) \,, \quad f_{\text{right}}(\zeta, \xi) = \delta^-_\xi \psi(\zeta/\xi, \alpha) \,,$$

$$\delta^-_\zeta f(\zeta) = f(q\zeta) - \rho(\zeta) f(\zeta) \,,$$

$$\omega_0(\zeta, \xi) = -\delta^-_\zeta \delta^-_\xi \Delta^{-1}_\zeta \psi(\zeta/\xi, \alpha) \,.$$

Main formula holds in a very general setting.

Main formula holds in a very general setting.

- Inhomogeneous lattice

- resolvent

$$\mathcal{R}_{\mathrm{dress}} - \mathcal{R}_{\mathrm{dress}} \star K_\alpha = K_\alpha \,,$$

$$f \star g(\zeta,\xi) = \int_\gamma f(\zeta,\eta) g(\eta,\xi) \frac{1}{1+\mathfrak{a}(\eta,\kappa)} \frac{1}{\rho(\eta)} \frac{d\eta^2}{\eta^2} \,.$$

- formula for $\omega_{\mathbf{n}}$ is

$$\frac{1}{4}\omega_{\mathbf{n}}(\zeta,\xi) = f_{\mathrm{left}} \star (I + \mathcal{R}_{\mathrm{dress}}) \star f_{\mathrm{right}}(\zeta,\xi) - \omega_0(\zeta,\xi) \,,$$

where

$$f_{\mathrm{left}}(\zeta,\xi) = \frac{1}{2\pi i}\delta^-_\zeta \psi(\zeta/\xi,\alpha) \,, \quad f_{\mathrm{right}}(\zeta,\xi) = \delta^-_\xi \psi(\zeta/\xi,\alpha) \,,$$

$$\delta^-_\zeta f(\zeta) = f(q\zeta) - \rho(\zeta) f(\zeta) \,,$$

$$\omega_0(\zeta,\xi) = -\delta^-_\zeta \delta^-_\xi \Delta^{-1}_\zeta \psi(\zeta/\xi,\alpha) \,.$$

- resolvent

$$\mathcal{R}_{\text{dress}} - \mathcal{R}_{\text{dress}} \star K_\alpha = K_\alpha ,$$

$$f \star g(\zeta, \xi) = \int_\gamma f(\zeta, \eta) g(\eta, \xi) \frac{1}{1 + \mathfrak{a}(\eta, \kappa)} \frac{1}{\rho(\eta)} \frac{d\eta^2}{\eta^2} .$$

- formula for $\omega_{\mathbf{n}}$ is

$$\frac{1}{4}\omega_{\mathbf{n}}(\zeta, \xi) = f_{\text{left}} \star (I + \mathcal{R}_{\text{dress}}) \star f_{\text{right}}(\zeta, \xi) - \omega_0(\zeta, \xi) ,$$

where

$$f_{\text{left}}(\zeta, \xi) = \frac{1}{2\pi i}\delta^-_\zeta \psi(\zeta/\xi, \alpha) , \quad f_{\text{right}}(\zeta, \xi) = \delta^-_\xi \psi(\zeta/\xi, \alpha) ,$$

$$\delta^-_\zeta f(\zeta) = f(q\zeta) - \rho(\zeta) f(\zeta) ,$$

$$\omega_0(\zeta, \xi) = -\delta^-_\zeta \delta^-_\xi \Delta^{-1}_\zeta \psi(\zeta/\xi, \alpha) .$$

- resolvent

$$\mathcal{R}_{\text{dress}} - \mathcal{R}_{\text{dress}} \star K_\alpha = K_\alpha \,,$$

$$f \star g(\zeta,\xi) = \int_\gamma f(\zeta,\eta) g(\eta,\xi) \frac{1}{1+\mathfrak{a}(\eta,\kappa)} \frac{1}{\rho(\eta)} \frac{d\eta^2}{\eta^2} \,.$$

- formula for $\omega_{\mathbf{n}}$ is

$$\frac{1}{4}\omega_{\mathbf{n}}(\zeta,\xi) = f_{\text{left}} \star (I + \mathcal{R}_{\text{dress}}) \star f_{\text{right}}(\zeta,\xi) - \omega_0(\zeta,\xi) \,,$$

where

$$f_{\text{left}}(\zeta,\xi) = \frac{1}{2\pi i}\delta^-_\zeta \psi(\zeta/\xi,\alpha) \,, \quad f_{\text{right}}(\zeta,\xi) = \delta^-_\xi \psi(\zeta/\xi,\alpha) \,,$$

$$\delta^-_\zeta f(\zeta) = f(q\zeta) - \rho(\zeta) f(\zeta) \,,$$

$$\omega_0(\zeta,\xi) = -\delta^-_\zeta \delta^-_\xi \Delta^{-1}_\zeta \psi(\zeta/\xi,\alpha) \,.$$

- resolvent

$$\mathcal{R}_{\rm dress} - \mathcal{R}_{\rm dress} \star K_\alpha = K_\alpha\,,$$

$$f \star g(\zeta,\xi) = \int_\gamma f(\zeta,\eta) g(\eta,\xi) \frac{1}{1+\mathfrak{a}(\eta,\kappa)} \frac{1}{\rho(\eta)} \frac{d\eta^2}{\eta^2}\,.$$

- formula for $\omega_{\mathbf{n}}$ is

$$\frac{1}{4}\omega_{\mathbf{n}}(\zeta,\xi) = f_{\rm left} \star (I + \mathcal{R}_{\rm dress}) \star f_{\rm right}(\zeta,\xi) - \omega_0(\zeta,\xi)\,.$$

where

$$f_{\rm left}(\zeta,\xi) = \frac{1}{2\pi i}\delta^-_\zeta \psi(\zeta/\xi,\alpha)\,, \quad f_{\rm right}(\zeta,\xi) = \delta^-_\xi \psi(\zeta/\xi,\alpha)\,,$$

$$\delta^-_\zeta f(\zeta) = f(q\zeta) - \rho(\zeta) f(\zeta)\,,$$

$$\omega_0(\zeta,\xi) = -\delta^-_\zeta \delta^-_\xi \Delta^{-1}_\zeta \psi(\zeta/\xi,\alpha)\,.$$

- resolvent

$$\mathcal{R}_{\mathrm{dress}} - \mathcal{R}_{\mathrm{dress}} \star K_\alpha = K_\alpha \,,$$

$$f \star g(\zeta,\xi) = \int_\gamma f(\zeta,\eta) g(\eta,\xi) \frac{1}{1+\mathfrak{a}(\eta,\kappa)} \frac{1}{\rho(\eta)} \frac{d\eta^2}{\eta^2} \,.$$

- formula for $\omega_{\mathbf{n}}$ is

$$\frac{1}{4}\omega_{\mathbf{n}}(\zeta,\xi) = f_{\mathrm{left}} \star (I + \mathcal{R}_{\mathrm{dress}}) \star f_{\mathrm{right}}(\zeta,\xi) - \omega_0(\zeta,\xi) \,.$$

where

$$f_{\mathrm{left}}(\zeta,\xi) = \frac{1}{2\pi i}\delta^-_\zeta \psi(\zeta/\xi,\alpha) \,, \quad f_{\mathrm{right}}(\zeta,\xi) = \delta^-_\xi \psi(\zeta/\xi,\alpha) \,,$$

$$\delta^-_\zeta f(\zeta) = f(q\zeta) - \rho(\zeta) f(\zeta) \,,$$

$$\omega_0(\zeta,\xi) = -\delta^-_\zeta \delta^-_\xi \Delta^{-1}_\zeta \psi(\zeta/\xi,\alpha) \,.$$

- resolvent

$$\mathcal{R}_{\text{dress}} - \mathcal{R}_{\text{dress}} \star K_\alpha = K_\alpha\,,$$

$$f \star g(\zeta,\xi) = \int_\gamma f(\zeta,\eta) g(\eta,\xi) \frac{1}{1+\mathfrak{a}(\eta,\kappa)} \frac{1}{\rho(\eta)} \frac{d\eta^2}{\eta^2}\,.$$

- formula for $\omega_{\mathbf{n}}$ is

$$\frac{1}{4}\omega_{\mathbf{n}}(\zeta,\xi) = f_{\text{left}} \star (I + \mathcal{R}_{\text{dress}}) \star f_{\text{right}}(\zeta,\xi) - \omega_0(\zeta,\xi)\,,$$

where

$$f_{\text{left}}(\zeta,\xi) = \frac{1}{2\pi i}\delta^-_\zeta \psi(\zeta/\xi,\alpha)\,, \quad f_{\text{right}}(\zeta,\xi) = \delta^-_\xi \psi(\zeta/\xi,\alpha)\,,$$

$$\delta^-_\zeta f(\zeta) = f(q\zeta) - \rho(\zeta) f(\zeta)\,,$$

$$\omega_0(\zeta,\xi) = -\delta^-_\zeta \delta^-_\xi \Delta^{-1}_\zeta \psi(\zeta/\xi,\alpha)\,.$$

- resolvent

$$\mathcal{R}_{\rm dress} - \mathcal{R}_{\rm dress} \star K_\alpha = K_\alpha ,$$

$$f \star g(\zeta, \xi) = \int_\gamma f(\zeta, \eta) g(\eta, \xi) \frac{1}{1 + \mathfrak{a}(\eta, \kappa)} \frac{1}{\rho(\eta)} \frac{d\eta^2}{\eta^2} .$$

- formula for $\omega_{\mathbf{n}}$ is

$$\frac{1}{4}\omega_{\mathbf{n}}(\zeta, \xi) = f_{\rm left} \star (I + \mathcal{R}_{\rm dress}) \star f_{\rm right}(\zeta, \xi) - \omega_0(\zeta, \xi) ,$$

where

$$f_{\rm left}(\zeta, \xi) = \frac{1}{2\pi i} \delta^-_\zeta \psi(\zeta/\xi, \alpha) , \quad f_{\rm right}(\zeta, \xi) = \delta^-_\xi \psi(\zeta/\xi, \alpha) ,$$

$$\delta^-_\zeta f(\zeta) = f(q\zeta) - \rho(\zeta) f(\zeta) ,$$

$$\omega_0(\zeta, \xi) = -\delta^-_\zeta \delta^-_\xi \Delta^{-1}_\zeta \psi(\zeta/\xi, \alpha) .$$

TBA data

- auxiliary function characterizing $|\kappa\rangle$

$$\log \mathfrak{a}(\zeta,\kappa) = -2\pi i\nu\kappa + \log\frac{a(\zeta)}{d(\zeta)} - \int_\gamma K_0(\zeta/\xi)\log(1+\mathfrak{a}(\xi,\kappa))\frac{d\xi^2}{\xi^2},$$

where γ encircles the Bethe roots clockwise, and

$$a(\zeta) = (1-q\zeta^2)^{\mathbf{n}}, \quad d(\zeta) = (1-q^{-1}\zeta^2)^{\mathbf{n}},$$

$$K_\alpha(\zeta) = \Delta_\zeta\psi(\zeta,\alpha), \quad \psi(\zeta,\alpha) = \frac{\zeta^\alpha}{\zeta^2-1},$$

$$\Delta_\zeta f(\zeta) = f(q\zeta) - f(q^{-1}\zeta).$$

TBA data

- auxiliary function characterizing $|\kappa\rangle$

$$\log \mathfrak{a}(\zeta,\kappa) = -2\pi i\nu\kappa + \log\frac{a(\zeta)}{d(\zeta)} - \int_\gamma K_0(\zeta/\xi)\log(1+\mathfrak{a}(\xi,\kappa))\frac{d\xi^2}{\xi^2},$$

where γ encircles the Bethe roots clockwise, and

$$a(\zeta) = (1-q\zeta^2)^{\mathbf{n}}, \quad d(\zeta) = (1-q^{-1}\zeta^2)^{\mathbf{n}},$$

$$K_\alpha(\zeta) = \Delta_\zeta\psi(\zeta,\alpha), \quad \psi(\zeta,\alpha) = \frac{\zeta^\alpha}{\zeta^2-1},$$

$$\Delta_\zeta f(\zeta) = f(q\zeta) - f(q^{-1}\zeta).$$

TBA data

- auxiliary function characterizing $|\kappa\rangle$

$$\log \mathfrak{a}(\zeta,\kappa) = -2\pi i \nu\kappa + \log\frac{a(\zeta)}{d(\zeta)} - \int_\gamma K_0(\zeta/\xi)\log(1+\mathfrak{a}(\xi,\kappa))\frac{d\xi^2}{\xi^2},$$

where γ encircles the Bethe roots clockwise, and

$$a(\zeta) = (1-q\zeta^2)^{\mathbf{n}}, \quad d(\zeta) = (1-q^{-1}\zeta^2)^{\mathbf{n}},$$
$$K_\alpha(\zeta) = \Delta_\zeta\psi(\zeta,\alpha), \quad \psi(\zeta,\alpha) = \frac{\zeta^\alpha}{\zeta^2-1},$$
$$\Delta_\zeta f(\zeta) = f(q\zeta) - f(q^{-1}\zeta).$$

The main formula

The following is the key result (JMS 2009).

$$Z_{\mathbf{n}}\left\{\mathbf{t}^*(\eta_1)\cdots\mathbf{t}^*(\eta_s)\mathbf{b}^*(\zeta_1)\cdots\mathbf{b}^*(\zeta_r)\mathbf{c}^*(\xi_r)\cdots\mathbf{c}^*(\xi_1)(q^{2\alpha S(0)})\right\}$$
$$=\prod_{i=1}^{s}2\rho(\eta_i)\cdot\det\left(\omega_{\mathbf{n}}(\zeta_j,\xi_k)\right).$$

where

$$\rho(\eta)=\frac{T(\eta,\kappa+\alpha)}{T(\eta,\kappa)},\quad T_{\mathbf{M}}(\eta,\kappa)|\kappa\rangle=T(\eta,\kappa)|\kappa\rangle.$$

and $\omega_{\mathbf{n}}(\zeta,\xi)$ is defined through the TBA data in the Matsubara space.

- resolvent

$$\mathcal{R}_{\mathrm{dress}} - \mathcal{R}_{\mathrm{dress}} \star K_\alpha = K_\alpha \, ,$$

$$f \star g(\zeta, \xi) = \int_\gamma f(\zeta, \eta) g(\eta, \xi) \frac{1}{1 + \mathfrak{a}(\eta, \kappa)} \frac{1}{\rho(\eta)} \frac{d\eta^2}{\eta^2} \, .$$

- resolvent

$$\mathcal{R}_{\text{dress}} - \mathcal{R}_{\text{dress}} \star K_\alpha = K_\alpha \,,$$

$$f \star g(\zeta, \xi) = \int_\gamma f(\zeta, \eta) g(\eta, \xi) \frac{1}{1 + \mathfrak{a}(\eta, \kappa)} \frac{1}{\rho(\eta)} \frac{d\eta^2}{\eta^2} \,.$$

Main formula holds in a very general setting.

Main formula holds in a very general setting.

- Inhomogeneous lattice

Main formula holds in a very general setting.

- Inhomogeneous lattice
- Arbitrary eigenvectors $|\kappa\rangle$, $\langle\kappa'|$ $\quad (\kappa' = \kappa + \alpha)$

Main formula holds in a very general setting.

- Inhomogeneous lattice
- Arbitrary eigenvectors $|\kappa\rangle$, $\langle\kappa'|$ $\quad(\kappa' = \kappa + \alpha)$

Main formula holds in a very general setting.

- Inhomogeneous lattice
- Arbitrary eigenvectors $|\kappa\rangle$, $\langle\kappa'|$ $\quad(\kappa' = \kappa + \alpha)$
- With a modification of $Z_{\mathbf{n}}$, κ, κ', α can be viewed as 'independent parameters'.

Main formula holds in a very general setting.

- Inhomogeneous lattice
- Arbitrary eigenvectors $|\kappa\rangle$, $\langle\kappa'|$ $\quad (\kappa' = \kappa + \alpha)$
- With a modification of $Z_{\mathbf{n}}$, κ, κ', α can be viewed as 'independent parameters'.

Main formula holds in a very general setting.

- Inhomogeneous lattice
- Arbitrary eigenvectors $|\kappa\rangle$, $\langle\kappa'|$ $\quad (\kappa' = \kappa + \alpha)$
- With a modification of $Z_{\mathbf{n}}$, κ, κ', α can be viewed as 'independent parameters'.

Main formula holds in a very general setting.

- Inhomogeneous lattice
- Arbitrary eigenvectors $|\kappa\rangle$, $\langle\kappa'|$ $(\kappa' = \kappa + \alpha)$
- With a modification of $Z_{\mathbf{n}}$, κ, κ', α can be viewed as 'independent parameters'.

Main formula holds in a very general setting.

- Inhomogeneous lattice
- Arbitrary eigenvectors $|\kappa\rangle$, $\langle\kappa'|$ $\quad(\kappa' = \kappa + \alpha)$
- With a modification of $Z_{\mathbf{n}}$, κ, κ', α can be viewed as 'independent parameters'.

Main formula holds in a very general setting.

- Inhomogeneous lattice
- Arbitrary eigenvectors $|\kappa\rangle$, $\langle\kappa'|$ $\quad (\kappa' = \kappa + \alpha)$
- With a modification of $Z_{\mathbf{n}}$, κ, κ', α can be viewed as 'independent parameters'.

Main formula holds in a very general setting.

- Inhomogeneous lattice
- Arbitrary eigenvectors $|\kappa\rangle$, $\langle\kappa'|$ $(\kappa' = \kappa + \alpha)$
- With a modification of $Z_{\mathbf{n}}$, κ, κ', α can be viewed as 'independent parameters'.

Main formula holds in a very general setting.

- Inhomogeneous lattice
- Arbitrary eigenvectors $|\kappa\rangle$, $\langle\kappa'|$ $\quad(\kappa'=\kappa+\alpha)$
- With a modification of $Z_{\mathbf{n}}$, κ, κ', α can be viewed as 'independent parameters'.

Main formula holds in a very general setting.

- Inhomogeneous lattice
- Arbitrary eigenvectors $|\kappa\rangle$, $\langle\kappa'|$ $\quad (\kappa' = \kappa + \alpha)$
- With a modification of $Z_{\mathbf{n}}$, κ, κ', α can be viewed as 'independent parameters'.

Main formula holds in a very general setting.

- Inhomogeneous lattice
- Arbitrary eigenvectors $|\kappa\rangle$, $\langle\kappa'|$ $\quad(\kappa' = \kappa + \alpha)$
- With a modification of $Z_{\mathbf{n}}$, κ, κ', α can be viewed as 'independent parameters'.

Main formula holds in a very general setting.

- Inhomogeneous lattice
- Arbitrary eigenvectors $|\kappa\rangle$, $\langle\kappa'|$ $\quad (\kappa' = \kappa + \alpha)$
- With a modification of $Z_{\mathbf{n}}$, κ, κ', α can be viewed as 'independent parameters'.

Main formula holds in a very general setting.

- Inhomogeneous lattice
- Arbitrary eigenvectors $|\kappa\rangle$, $\langle\kappa'|$ $\quad (\kappa' = \kappa + \alpha)$
- With a modification of $Z_{\mathbf{n}}$, κ, κ', α can be viewed as 'independent parameters'.

Main formula holds in a very general setting.

- Inhomogeneous lattice
- Arbitrary eigenvectors $|\kappa\rangle$, $\langle\kappa'|$ $\quad (\kappa' = \kappa + \alpha)$
- With a modification of $Z_{\mathbf{n}}$, κ, κ', α can be viewed as 'independent parameters'.

Main formula holds in a very general setting.

- Inhomogeneous lattice
- Arbitrary eigenvectors $|\kappa\rangle$, $\langle\kappa'|$ $\quad(\kappa' = \kappa + \alpha)$
- With a modification of $Z_{\mathbf{n}}$, κ, κ', α can be viewed as 'independent parameters'.

Main formula holds in a very general setting.

- Inhomogeneous lattice
- Arbitrary eigenvectors $|\kappa\rangle$, $\langle\kappa'|$ $\quad (\kappa' = \kappa + \alpha)$
- With a modification of $Z_{\mathbf{n}}$, κ, κ', α can be viewed as 'independent parameters'.

Main formula holds in a very general setting.

- Inhomogeneous lattice
- Arbitrary eigenvectors $|\kappa\rangle$, $\langle\kappa'|$ $\quad (\kappa' = \kappa + \alpha)$
- With a modification of $Z_{\mathbf{n}}$, κ, κ', α can be viewed as 'independent parameters'.

Main formula holds in a very general setting.

- Inhomogeneous lattice
- Arbitrary eigenvectors $|\kappa\rangle$, $\langle\kappa'|$ $\quad(\kappa' = \kappa + \alpha)$
- With a modification of $Z_{\mathbf{n}}$, κ, κ', α can be viewed as 'independent parameters'.

In the following analysis we make a technical assumption

$$\kappa' = \kappa\,.$$

Main formula holds in a very general setting.

- Inhomogeneous lattice
- Arbitrary eigenvectors $|\kappa\rangle$, $\langle\kappa'|$ $\quad (\kappa' = \kappa + \alpha)$
- With a modification of $Z_{\mathbf{n}}$, κ, κ', α can be viewed as 'independent parameters'.

In the following analysis we make a technical assumption

$$\kappa' = \kappa\,.$$

Main formula holds in a very general setting.

- Inhomogeneous lattice
- Arbitrary eigenvectors $|\kappa\rangle$, $\langle\kappa'|$ $\quad(\kappa' = \kappa + \alpha)$
- With a modification of $Z_{\mathbf{n}}$, κ, κ', α can be viewed as 'independent parameters'.

In the following analysis we make a technical assumption

$$\kappa' = \kappa\,.$$

Main formula holds in a very general setting.

- Inhomogeneous lattice
- Arbitrary eigenvectors $|\kappa\rangle$, $\langle\kappa'|$ $\quad (\kappa' = \kappa + \alpha)$
- With a modification of $Z_{\mathbf{n}}$, κ, κ', α can be viewed as 'independent parameters'.

In the following analysis we make a technical assumption

$$\kappa' = \kappa\,.$$

Main formula holds in a very general setting.

- Inhomogeneous lattice
- Arbitrary eigenvectors $|\kappa\rangle$, $\langle\kappa'|$ $\quad (\kappa' = \kappa + \alpha)$
- With a modification of $Z_{\mathbf{n}}$, κ, κ', α can be viewed as 'independent parameters'.

In the following analysis we make a technical assumption

$$\kappa' = \kappa \,.$$

Main formula holds in a very general setting.

- Inhomogeneous lattice
- Arbitrary eigenvectors $|\kappa\rangle$, $\langle\kappa'|$ $\quad (\kappa' = \kappa + \alpha)$
- With a modification of $Z_{\mathbf{n}}$, κ, κ', α can be viewed as 'independent parameters'.

In the following analysis we make a technical assumption

$$\kappa' = \kappa \,.$$

Main formula holds in a very general setting.

- Inhomogeneous lattice
- Arbitrary eigenvectors $|\kappa\rangle$, $\langle\kappa'|$ $\quad (\kappa' = \kappa + \alpha)$
- With a modification of $Z_{\mathbf{n}}$, κ, κ', α can be viewed as 'independent parameters'.

In the following analysis we make a technical assumption

$$\kappa' = \kappa\,.$$

Main formula holds in a very general setting.

- Inhomogeneous lattice
- Arbitrary eigenvectors $|\kappa\rangle$, $\langle\kappa'|$ $\quad (\kappa' = \kappa + \alpha)$
- With a modification of $Z_{\mathbf{n}}$, κ, κ', α can be viewed as 'independent parameters'.

In the following analysis we make a technical assumption

$$\kappa' = \kappa\,.$$

Main formula holds in a very general setting.

- Inhomogeneous lattice
- Arbitrary eigenvectors $|\kappa\rangle$, $\langle\kappa'|$ $\quad (\kappa' = \kappa + \alpha)$
- With a modification of $Z_{\mathbf{n}}$, κ, κ', α can be viewed as 'independent parameters'.

In the following analysis we make a technical assumption

$$\kappa' = \kappa\,.$$

Main formula holds in a very general setting.

- Inhomogeneous lattice
- Arbitrary eigenvectors $|\kappa\rangle$, $\langle\kappa'|$ $\quad (\kappa' = \kappa + \alpha)$
- With a modification of $Z_{\mathbf{n}}$, κ, κ', α can be viewed as 'independent parameters'.

In the following analysis we make a technical assumption

$$\kappa' = \kappa \,.$$

Main formula holds in a very general setting.

- Inhomogeneous lattice
- Arbitrary eigenvectors $|\kappa\rangle$, $\langle\kappa'|$ $\quad (\kappa' = \kappa + \alpha)$
- With a modification of $Z_{\mathbf{n}}$, κ, κ', α can be viewed as 'independent parameters'.

In the following analysis we make a technical assumption

$$\kappa' = \kappa\,.$$

Main formula holds in a very general setting.

- Inhomogeneous lattice
- Arbitrary eigenvectors $|\kappa\rangle$, $\langle\kappa'|$ $\quad (\kappa' = \kappa + \alpha)$
- With a modification of $Z_{\mathbf{n}}$, κ, κ', α can be viewed as 'independent parameters'.

In the following analysis we make a technical assumption

$$\kappa' = \kappa\,.$$

Main formula holds in a very general setting.

- Inhomogeneous lattice
- Arbitrary eigenvectors $|\kappa\rangle$, $\langle\kappa'|$ $\quad (\kappa' = \kappa + \alpha)$
- With a modification of $Z_{\mathbf{n}}$, κ, κ', α can be viewed as 'independent parameters'.

In the following analysis we make a technical assumption

$$\kappa' = \kappa \,.$$

Main formula holds in a very general setting.

- Inhomogeneous lattice
- Arbitrary eigenvectors $|\kappa\rangle$, $\langle\kappa'|$ $\quad (\kappa' = \kappa + \alpha)$
- With a modification of $Z_{\mathbf{n}}$, κ, κ', α can be viewed as 'independent parameters'.

In the following analysis we make a technical assumption

$$\kappa' = \kappa \,.$$

Main formula holds in a very general setting.

- Inhomogeneous lattice
- Arbitrary eigenvectors $|\kappa\rangle$, $\langle\kappa'|$ $\quad (\kappa' = \kappa + \alpha)$
- With a modification of $Z_{\mathbf{n}}$, κ, κ', α can be viewed as 'independent parameters'.

In the following analysis we make a technical assumption

$$\kappa' = \kappa \,.$$

CFT limit

In the limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta = (Ca)^{\nu}\lambda \quad (\lambda \text{ fixed})\,,$$

the Matsubara transfer matrix scales to that of chiral CFT (Bazhanov et al.1996)

$$T^{\mathrm{sc}}(\lambda,\kappa) = \lim T_{\mathbf{M}}\left((Ca)^{\nu}\lambda,\kappa\right)\,.$$

CFT limit

In the limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta = (Ca)^{\nu}\lambda \quad (\lambda \text{ fixed})\,,$$

the Matsubara transfer matrix scales to that of chiral CFT (Bazhanov et al.1996)

$$T^{\mathrm{sc}}(\lambda,\kappa) = \lim T_{\mathbf{M}}\left((Ca)^{\nu}\lambda,\kappa\right)\,.$$

CFT limit

In the limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta = (Ca)^{\nu}\lambda \quad (\lambda \text{ fixed})\,,$$

the Matsubara transfer matrix scales to that of chiral CFT (Bazhanov et al.1996)

$$T^{sc}(\lambda,\kappa) = \lim T_{\mathbf{M}}\left((Ca)^{\nu}\lambda,\kappa\right)\,.$$

CFT limit

In the limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta = (Ca)^{\nu}\lambda \quad (\lambda \text{ fixed})\,,$$

the Matsubara transfer matrix scales to that of chiral CFT (Bazhanov et al.1996)

$$T^{\mathrm{sc}}(\lambda,\kappa) = \lim T_{\mathbf{M}}\left((Ca)^{\nu}\lambda,\kappa\right)\,.$$

CFT limit

In the limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta = (Ca)^{\nu}\lambda \quad (\lambda \text{ fixed})\,,$$

the Matsubara transfer matrix scales to that of chiral CFT (Bazhanov et al.1996)

$$T^{\mathrm{sc}}(\lambda,\kappa) = \lim T_{\mathbf{M}}\left((Ca)^{\nu}\lambda,\kappa\right)\,.$$

CFT limit

In the limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta = (Ca)^{\nu}\lambda \quad (\lambda \text{ fixed})\,,$$

the Matsubara transfer matrix scales to that of chiral CFT (Bazhanov et al.1996)

$$T^{\mathrm{sc}}(\lambda,\kappa) = \lim T_{\mathbf{M}}\left((Ca)^{\nu}\lambda,\kappa\right)\,.$$

CFT limit

In the limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta = (Ca)^{\nu}\lambda \quad (\lambda \text{ fixed})\,,$$

the Matsubara transfer matrix scales to that of chiral CFT (Bazhanov et al.1996)

$$T^{\mathrm{sc}}(\lambda, \kappa) = \lim T_{\mathbf{M}}\left((Ca)^{\nu}\lambda, \kappa\right)\,.$$

CFT limit

In the limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta = (Ca)^{\nu}\lambda \quad (\lambda \text{ fixed})\,,$$

the Matsubara transfer matrix scales to that of chiral CFT (Bazhanov et al.1996)

$$T^{\mathrm{sc}}(\lambda,\kappa) = \lim T_{\mathbf{M}}\left((Ca)^{\nu}\lambda,\kappa\right)\,.$$

CFT limit

In the limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta = (Ca)^{\nu}\lambda \quad (\lambda \text{ fixed})\,,$$

the Matsubara transfer matrix scales to that of chiral CFT (Bazhanov et al.1996)

$$T^{\rm sc}(\lambda,\kappa) = \lim T_{\mathbf{M}}\left((Ca)^{\nu}\lambda,\kappa\right)\,.$$

CFT limit

In the limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta = (Ca)^{\nu}\lambda \quad (\lambda \text{ fixed})\,,$$

the Matsubara transfer matrix scales to that of chiral CFT (Bazhanov et al.1996)

$$T^{\rm sc}(\lambda,\kappa) = \lim T_{\mathbf{M}}\left((Ca)^{\nu}\lambda,\kappa\right)\,.$$

CFT limit

In the limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta = (Ca)^{\nu}\lambda \quad (\lambda \text{ fixed})\,,$$

the Matsubara transfer matrix scales to that of chiral CFT (Bazhanov et al.1996)

$$T^{\mathrm{sc}}(\lambda, \kappa) = \lim T_{\mathbf{M}}\left((Ca)^{\nu}\lambda, \kappa\right)\,.$$

CFT limit

In the limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta = (Ca)^{\nu}\lambda \quad (\lambda \text{ fixed})\,,$$

the Matsubara transfer matrix scales to that of chiral CFT (Bazhanov et al.1996)

$$T^{\mathrm{sc}}(\lambda, \kappa) = \lim T_{\mathbf{M}}\left((Ca)^{\nu}\lambda, \kappa\right)\,.$$

CFT limit

In the limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta = (Ca)^{\nu}\lambda \quad (\lambda \text{ fixed})\,,$$

the Matsubara transfer matrix scales to that of chiral CFT (Bazhanov et al.1996)

$$T^{\mathrm{sc}}(\lambda,\kappa) = \lim T_{\mathbf{M}}\left((Ca)^{\nu}\lambda,\kappa\right)\,.$$

CFT limit

In the limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta = (Ca)^{\nu}\lambda \quad (\lambda \text{ fixed})\,,$$

the Matsubara transfer matrix scales to that of chiral CFT (Bazhanov et al.1996)

$$T^{\mathrm{sc}}(\lambda,\kappa) = \lim T_{\mathbf{M}}\left((Ca)^{\nu}\lambda,\kappa\right)\,.$$

CFT limit

In the limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta = (Ca)^{\nu}\lambda \quad (\lambda \text{ fixed})\,,$$

the Matsubara transfer matrix scales to that of chiral CFT (Bazhanov et al.1996)

$$T^{\rm sc}(\lambda,\kappa) = \lim T_{\mathbf{M}}\left((Ca)^{\nu}\lambda,\kappa\right)\,.$$

CFT limit

In the limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta = (Ca)^{\nu}\lambda \quad (\lambda \text{ fixed})\,.$$

the Matsubara transfer matrix scales to that of chiral CFT (Bazhanov et al.1996)

$$T^{\mathrm{sc}}(\lambda, \kappa) = \lim T_{\mathbf{M}}\left((Ca)^{\nu}\lambda, \kappa\right)\,.$$

CFT limit

In the limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta = (Ca)^{\nu}\lambda \quad (\lambda \text{ fixed})\,,$$

the Matsubara transfer matrix scales to that of chiral CFT (Bazhanov et al.1996)

$$T^{\mathrm{sc}}(\lambda, \kappa) = \lim T_{\mathbf{M}}\left((Ca)^{\nu}\lambda, \kappa\right)\,.$$

CFT limit

In the limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta = (Ca)^{\nu}\lambda \quad (\lambda \text{ fixed})\,,$$

the Matsubara transfer matrix scales to that of chiral CFT (Bazhanov et al.1996)

$$T^{\mathrm{sc}}(\lambda,\kappa) = \lim T_{\mathbf{M}}\left((Ca)^{\nu}\lambda,\kappa\right)\,.$$

CFT limit

In the limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta = (Ca)^{\nu}\lambda \quad (\lambda \text{ fixed})\,.$$

the Matsubara transfer matrix scales to that of chiral CFT (Bazhanov et al.1996)

$$T^{\mathrm{sc}}(\lambda,\kappa) = \lim T_{\mathbf{M}}\left((Ca)^{\nu}\lambda,\kappa\right)\,.$$

CFT limit

In the limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta = (Ca)^{\nu}\lambda \quad (\lambda \text{ fixed})\,,$$

the Matsubara transfer matrix scales to that of chiral CFT (Bazhanov et al.1996)

$$T^{\mathrm{sc}}(\lambda,\kappa) = \lim T_{\mathbf{M}}\left((Ca)^{\nu}\lambda,\kappa\right)\,.$$

CFT limit

In the limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta = (Ca)^{\nu}\lambda \quad (\lambda \text{ fixed})\,,$$

the Matsubara transfer matrix scales to that of chiral CFT (Bazhanov et al.1996)

$$T^{\mathrm{sc}}(\lambda,\kappa) = \lim T_{\mathbf{M}}\left((Ca)^{\nu}\lambda,\kappa\right)\,.$$

CFT limit

In the limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta = (Ca)^{\nu}\lambda \quad (\lambda \text{ fixed})\,,$$

the Matsubara transfer matrix scales to that of chiral CFT (Bazhanov et al.1996)

$$T^{\mathrm{sc}}(\lambda,\kappa) = \lim T_{\mathbf{M}}\left((Ca)^{\nu}\lambda,\kappa\right)\,.$$

CFT limit

In the limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta = (Ca)^{\nu}\lambda \quad (\lambda \text{ fixed})\,,$$

the Matsubara transfer matrix scales to that of chiral CFT (Bazhanov et al.1996)

$$T^{\rm sc}(\lambda,\kappa) = \lim T_{\mathbf{M}}\left((Ca)^{\nu}\lambda,\kappa\right)\,.$$

CFT limit

In the limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta = (Ca)^{\nu}\lambda \quad (\lambda \text{ fixed})\,,$$

the Matsubara transfer matrix scales to that of chiral CFT (Bazhanov et al.1996)

$$T^{\mathrm{sc}}(\lambda,\kappa) = \lim T_{\mathbf{M}}\left((Ca)^{\nu}\lambda,\kappa\right)\,.$$

CFT limit

In the limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta = (Ca)^{\nu}\lambda \quad (\lambda \text{ fixed})\,.$$

the Matsubara transfer matrix scales to that of chiral CFT (Bazhanov et al.1996)

$$T^{\mathrm{sc}}(\lambda,\kappa) = \lim T_{\mathbf{M}}\left((Ca)^{\nu}\lambda,\kappa\right)\,.$$

CFT limit

In the limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta = (Ca)^{\nu}\lambda \quad (\lambda \text{ fixed})\,.$$

the Matsubara transfer matrix scales to that of chiral CFT (Bazhanov et al.1996)

$$T^{\rm sc}(\lambda,\kappa) = \lim T_{\mathbf{M}}\left((Ca)^{\nu}\lambda,\kappa\right)\,.$$

CFT limit

In the limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0 \,, \quad \zeta = (Ca)^{\nu}\lambda \quad (\lambda \text{ fixed}) \,,$$

the Matsubara transfer matrix scales to that of chiral CFT (Bazhanov et al.1996)

$$T^{\mathrm{sc}}(\lambda, \kappa) = \lim T_{\mathbf{M}}\left((Ca)^{\nu}\lambda, \kappa\right) \,.$$

CFT limit

In the limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta = (Ca)^{\nu}\lambda \quad (\lambda \text{ fixed})\,,$$

the Matsubara transfer matrix scales to that of chiral CFT (Bazhanov et al.1996)

$$T^{\rm sc}(\lambda, \kappa) = \lim T_{\mathbf{M}}\left((Ca)^{\nu}\lambda, \kappa\right)\,.$$

CFT limit

In the limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta = (Ca)^{\nu}\lambda \quad (\lambda \text{ fixed})\,.$$

the Matsubara transfer matrix scales to that of chiral CFT (Bazhanov et al.1996)

$$T^{\mathrm{sc}}(\lambda,\kappa) = \lim T_{\mathbf{M}}\left((Ca)^{\nu}\lambda,\kappa\right)\,.$$

CFT limit

In the limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta = (Ca)^{\nu}\lambda \quad (\lambda \text{ fixed})\,,$$

the Matsubara transfer matrix scales to that of chiral CFT (Bazhanov et al.1996)

$$T^{\mathrm{sc}}(\lambda,\kappa) = \lim T_{\mathbf{M}}\left((Ca)^{\nu}\lambda,\kappa\right)\,.$$

$T^{\mathrm{sc}}(\lambda,\kappa)$ is entire in λ^2 and has the asymptotics

$$\log T^{\mathrm{sc}}(\lambda,\kappa) \simeq \sum_{j=0}^{\infty} C_{2j-1} I_{2j-1} \lambda^{-\frac{2j-1}{\nu}} \quad (\lambda^2 \to \infty)\,,$$

$$T^{\mathrm{sc}}(\lambda,\kappa) = 2\cos\pi\nu\kappa + \sum_{j=1}^{\infty} G_{2j}\lambda^{2j} \quad (\lambda^2 \to 0)\,.$$

CFT limit

In the limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta = (Ca)^{\nu}\lambda \quad (\lambda \text{ fixed})\,,$$

the Matsubara transfer matrix scales to that of chiral CFT (Bazhanov et al.1996)

$$T^{\mathrm{sc}}(\lambda,\kappa) = \lim T_{\mathbf{M}}\left((Ca)^{\nu}\lambda,\kappa\right)\,.$$

$T^{\mathrm{sc}}(\lambda,\kappa)$ is entire in λ^2 and has the asymptotics

$$\log T^{\mathrm{sc}}(\lambda,\kappa) \simeq \sum_{j=0}^{\infty} C_{2j-1} I_{2j-1} \lambda^{-\frac{2j-1}{\nu}} \quad (\lambda^2 \to \infty)\,,$$

$$T^{\mathrm{sc}}(\lambda,\kappa) = 2\cos\pi\nu\kappa + \sum_{j=1}^{\infty} G_{2j}\lambda^{2j} \quad (\lambda^2 \to 0)\,.$$

CFT limit

In the limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta = (Ca)^{\nu}\lambda \quad (\lambda \text{ fixed})\,,$$

the Matsubara transfer matrix scales to that of chiral CFT (Bazhanov et al.1996)

$$T^{\mathrm{sc}}(\lambda,\kappa) = \lim T_{\mathbf{M}}\left((Ca)^{\nu}\lambda,\kappa\right)\,.$$

$T^{\mathrm{sc}}(\lambda,\kappa)$ is entire in λ^2 and has the asymptotics

$$\log T^{\mathrm{sc}}(\lambda,\kappa) \simeq \sum_{j=0}^{\infty} C_{2j-1} I_{2j-1} \lambda^{-\frac{2j-1}{\nu}} \quad (\lambda^2 \to \infty)\,,$$

$$T^{\mathrm{sc}}(\lambda,\kappa) = 2\cos\pi\nu\kappa + \sum_{j=1}^{\infty} G_{2j}\lambda^{2j} \quad (\lambda^2 \to 0)\,.$$

CFT limit

In the limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta = (Ca)^{\nu}\lambda \quad (\lambda \text{ fixed})\,,$$

the Matsubara transfer matrix scales to that of chiral CFT (Bazhanov et al.1996)

$$T^{\mathrm{sc}}(\lambda,\kappa) = \lim T_{\mathbf{M}}\left((Ca)^{\nu}\lambda,\kappa\right)\,.$$

$T^{\mathrm{sc}}(\lambda,\kappa)$ is entire in λ^2 and has the asymptotics

$$\log T^{\mathrm{sc}}(\lambda,\kappa) \simeq \sum_{j=0}^{\infty} C_{2j-1} I_{2j-1} \lambda^{-\frac{2j-1}{\nu}} \quad (\lambda^2 \to \infty)\,.$$

$$T^{\mathrm{sc}}(\lambda,\kappa) = 2\cos\pi\nu\kappa + \sum_{j=1}^{\infty} G_{2j}\lambda^{2j} \quad (\lambda^2 \to 0)\,.$$

CFT limit

In the limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta = (Ca)^{\nu}\lambda \quad (\lambda \text{ fixed})\,,$$

the Matsubara transfer matrix scales to that of chiral CFT (Bazhanov et al.1996)

$$T^{\mathrm{sc}}(\lambda,\kappa) = \lim T_{\mathbf{M}}\left((Ca)^{\nu}\lambda,\kappa\right)\,.$$

$T^{\mathrm{sc}}(\lambda,\kappa)$ is entire in λ^2 and has the asymptotics

$$\log T^{\mathrm{sc}}(\lambda,\kappa) \simeq \sum_{j=0}^{\infty} C_{2j-1} I_{2j-1} \lambda^{-\frac{2j-1}{\nu}} \quad (\lambda^2 \to \infty)\,,$$

$$T^{\mathrm{sc}}(\lambda,\kappa) = 2\cos\pi\nu\kappa + \sum_{j=1}^{\infty} G_{2j}\lambda^{2j} \quad (\lambda^2 \to 0)\,.$$

CFT limit

In the limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta = (Ca)^{\nu}\lambda \quad (\lambda \text{ fixed})\,.$$

the Matsubara transfer matrix scales to that of chiral CFT (Bazhanov et al.1996)

$$T^{\mathrm{sc}}(\lambda,\kappa) = \lim T_{\mathbf{M}}\left((Ca)^{\nu}\lambda,\kappa\right)\,.$$

$T^{\mathrm{sc}}(\lambda,\kappa)$ is entire in λ^2 and has the asymptotics

$$\log T^{\mathrm{sc}}(\lambda,\kappa) \simeq \sum_{j=0}^{\infty} C_{2j-1} I_{2j-1} \lambda^{-\frac{2j-1}{\nu}} \quad (\lambda^2 \to \infty)\,.$$

$$T^{\mathrm{sc}}(\lambda,\kappa) = 2\cos\pi\nu\kappa + \sum_{j=1}^{\infty} G_{2j}\lambda^{2j} \quad (\lambda^2 \to 0)\,.$$

CFT limit

In the limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta = (Ca)^{\nu}\lambda \quad (\lambda \text{ fixed})\,.$$

the Matsubara transfer matrix scales to that of chiral CFT (Bazhanov et al.1996)

$$T^{\rm sc}(\lambda, \kappa) = \lim T_{\mathbf{M}}\left((Ca)^{\nu}\lambda, \kappa\right)\,.$$

$T^{\rm sc}(\lambda, \kappa)$ is entire in λ^2 and has the asymptotics

$$\log T^{\rm sc}(\lambda, \kappa) \simeq \sum_{j=0}^{\infty} C_{2j-1} I_{2j-1} \lambda^{-\frac{2j-1}{\nu}} \quad (\lambda^2 \to \infty)\,,$$

$$T^{\rm sc}(\lambda, \kappa) = 2\cos\pi\nu\kappa + \sum_{j=1}^{\infty} G_{2j}\lambda^{2j} \quad (\lambda^2 \to 0)\,.$$

CFT limit

In the limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta = (Ca)^{\nu}\lambda \quad (\lambda \text{ fixed})\,,$$

the Matsubara transfer matrix scales to that of chiral CFT (Bazhanov et al.1996)

$$T^{\mathrm{sc}}(\lambda,\kappa) = \lim T_{\mathbf{M}}\left((Ca)^{\nu}\lambda,\kappa\right)\,.$$

$T^{\mathrm{sc}}(\lambda,\kappa)$ is entire in λ^2 and has the asymptotics

$$\log T^{\mathrm{sc}}(\lambda,\kappa) \simeq \sum_{j=0}^{\infty} C_{2j-1} I_{2j-1} \lambda^{-\frac{2j-1}{\nu}} \quad (\lambda^2 \to \infty)\,,$$

$$T^{\mathrm{sc}}(\lambda,\kappa) = 2\cos\pi\nu\kappa + \sum_{j=1}^{\infty} G_{2j}\lambda^{2j} \quad (\lambda^2 \to 0)\,.$$

CFT limit

In the limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta = (Ca)^{\nu}\lambda \quad (\lambda \text{ fixed})\,,$$

the Matsubara transfer matrix scales to that of chiral CFT (Bazhanov et al.1996)

$$T^{\mathrm{sc}}(\lambda,\kappa) = \lim T_{\mathbf{M}}\left((Ca)^{\nu}\lambda,\kappa\right)\,.$$

$T^{\mathrm{sc}}(\lambda,\kappa)$ is entire in λ^2 and has the asymptotics

$$\log T^{\mathrm{sc}}(\lambda,\kappa) \simeq \sum_{j=0}^{\infty} C_{2j-1} I_{2j-1} \lambda^{-\frac{2j-1}{\nu}} \quad (\lambda^2 \to \infty)\,,$$

$$T^{\mathrm{sc}}(\lambda,\kappa) = 2\cos\pi\nu\kappa + \sum_{j=1}^{\infty} G_{2j}\lambda^{2j} \quad (\lambda^2 \to 0)\,.$$

CFT limit

In the limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta = (Ca)^{\nu}\lambda \quad (\lambda \text{ fixed})\,,$$

the Matsubara transfer matrix scales to that of chiral CFT (Bazhanov et al.1996)

$$T^{\mathrm{sc}}(\lambda,\kappa) = \lim T_{\mathbf{M}}\left((Ca)^{\nu}\lambda,\kappa\right)\,.$$

$T^{\mathrm{sc}}(\lambda,\kappa)$ is entire in λ^2 and has the asymptotics

$$\log T^{\mathrm{sc}}(\lambda,\kappa) \simeq \sum_{j=0}^{\infty} C_{2j-1} I_{2j-1} \lambda^{-\frac{2j-1}{\nu}} \quad (\lambda^2 \to \infty)\,,$$

$$T^{\mathrm{sc}}(\lambda,\kappa) = 2\cos\pi\nu\kappa + \sum_{j=1}^{\infty} G_{2j}\lambda^{2j} \quad (\lambda^2 \to 0)\,.$$

CFT limit

In the limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0, \quad \zeta = (Ca)^{\nu}\lambda \quad (\lambda \text{ fixed}),$$

the Matsubara transfer matrix scales to that of chiral CFT (Bazhanov et al.1996)

$$T^{\mathrm{sc}}(\lambda,\kappa) = \lim T_{\mathbf{M}}\left((Ca)^{\nu}\lambda,\kappa\right).$$

$T^{\mathrm{sc}}(\lambda,\kappa)$ is entire in λ^2 and has the asymptotics

$$\log T^{\mathrm{sc}}(\lambda,\kappa) \simeq \sum_{j=0}^{\infty} C_{2j-1} I_{2j-1} \lambda^{-\frac{2j-1}{\nu}} \quad (\lambda^2 \to \infty),$$

$$T^{\mathrm{sc}}(\lambda,\kappa) = 2\cos\pi\nu\kappa + \sum_{j=1}^{\infty} G_{2j}\lambda^{2j} \quad (\lambda^2 \to 0).$$

CFT limit

In the limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta = (Ca)^{\nu}\lambda \quad (\lambda \text{ fixed})\,.$$

the Matsubara transfer matrix scales to that of chiral CFT (Bazhanov et al.1996)

$$T^{\mathrm{sc}}(\lambda,\kappa) = \lim T_{\mathbf{M}}\left((Ca)^{\nu}\lambda,\kappa\right)\,.$$

$T^{\mathrm{sc}}(\lambda,\kappa)$ is entire in λ^2 and has the asymptotics

$$\log T^{\mathrm{sc}}(\lambda,\kappa) \simeq \sum_{j=0}^{\infty} C_{2j-1} I_{2j-1} \lambda^{-\frac{2j-1}{\nu}} \quad (\lambda^2 \to \infty)\,,$$

$$T^{\mathrm{sc}}(\lambda,\kappa) = 2\cos\pi\nu\kappa + \sum_{j=1}^{\infty} G_{2j}\lambda^{2j} \quad (\lambda^2 \to 0)\,.$$

CFT limit

In the limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta = (Ca)^{\nu}\lambda \quad (\lambda \text{ fixed})\,,$$

the Matsubara transfer matrix scales to that of chiral CFT (Bazhanov et al.1996)

$$T^{\mathrm{sc}}(\lambda,\kappa) = \lim T_{\mathbf{M}}\left((Ca)^{\nu}\lambda,\kappa\right)\,.$$

$T^{\mathrm{sc}}(\lambda,\kappa)$ is entire in λ^2 and has the asymptotics

$$\log T^{\mathrm{sc}}(\lambda,\kappa) \simeq \sum_{j=0}^{\infty} C_{2j-1} I_{2j-1} \lambda^{-\frac{2j-1}{\nu}} \quad (\lambda^2 \to \infty)\,,$$

$$T^{\mathrm{sc}}(\lambda,\kappa) = 2\cos\pi\nu\kappa + \sum_{j=1}^{\infty} G_{2j}\lambda^{2j} \quad (\lambda^2 \to 0)\,.$$

CFT limit

In the limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta = (Ca)^{\nu}\lambda \quad (\lambda \text{ fixed})\,,$$

the Matsubara transfer matrix scales to that of chiral CFT (Bazhanov et al.1996)

$$T^{\mathrm{sc}}(\lambda,\kappa) = \lim T_{\mathbf{M}}\left((Ca)^{\nu}\lambda,\kappa\right)\,.$$

$T^{\mathrm{sc}}(\lambda,\kappa)$ is entire in λ^2 and has the asymptotics

$$\log T^{\mathrm{sc}}(\lambda,\kappa) \simeq \sum_{j=0}^{\infty} C_{2j-1} I_{2j-1} \lambda^{-\frac{2j-1}{\nu}} \quad (\lambda^2 \to \infty)\,,$$

$$T^{\mathrm{sc}}(\lambda,\kappa) = 2\cos\pi\nu\kappa + \sum_{j=1}^{\infty} G_{2j}\lambda^{2j} \quad (\lambda^2 \to 0)\,.$$

CFT limit

In the limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0 , \quad \zeta = (Ca)^{\nu}\lambda \quad (\lambda \text{ fixed}) .$$

the Matsubara transfer matrix scales to that of chiral CFT (Bazhanov et al.1996)

$$T^{\mathrm{sc}}(\lambda, \kappa) = \lim T_{\mathbf{M}}\left((Ca)^{\nu}\lambda, \kappa\right) .$$

$T^{\mathrm{sc}}(\lambda, \kappa)$ is entire in λ^2 and has the asymptotics

$$\log T^{\mathrm{sc}}(\lambda, \kappa) \simeq \sum_{j=0}^{\infty} C_{2j-1} I_{2j-1} \lambda^{-\frac{2j-1}{\nu}} \quad (\lambda^2 \to \infty) ,$$

$$T^{\mathrm{sc}}(\lambda, \kappa) = 2\cos\pi\nu\kappa + \sum_{j=1}^{\infty} G_{2j}\lambda^{2j} \quad (\lambda^2 \to 0) .$$

CFT limit

In the limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0, \quad \zeta = (Ca)^{\nu}\lambda \quad (\lambda \text{ fixed}),$$

the Matsubara transfer matrix scales to that of chiral CFT (Bazhanov et al.1996)

$$T^{\mathrm{sc}}(\lambda,\kappa) = \lim T_{\mathbf{M}}\left((Ca)^{\nu}\lambda,\kappa\right).$$

$T^{\mathrm{sc}}(\lambda,\kappa)$ is entire in λ^2 and has the asymptotics

$$\log T^{\mathrm{sc}}(\lambda,\kappa) \simeq \sum_{j=0}^{\infty} C_{2j-1} I_{2j-1} \lambda^{-\frac{2j-1}{\nu}} \quad (\lambda^2 \to \infty),$$

$$T^{\mathrm{sc}}(\lambda,\kappa) = 2\cos\pi\nu\kappa + \sum_{j=1}^{\infty} G_{2j}\lambda^{2j} \quad (\lambda^2 \to 0).$$

The coefficients are

$$I_{2j-1} \;:\; \text{local integrals of motion}\,,$$
$$G_{2j} \;:\; \text{non-local integrals of motion}\,.$$

The coefficients are

I_{2j-1} : local integrals of motion .

G_{2j} : non-local integrals of motion .

For the function $\omega_{\mathbf{n}}(\zeta, \xi)$:

For the function $\omega_{\mathbf{n}}(\zeta,\xi)$:

$$\omega^{\mathrm{sc}}(\lambda,\mu)=\lim\frac{1}{4}\omega_{\mathbf{n}}\Big((Ca)^{\nu}\lambda,(Ca)^{\nu}\mu\Big)$$

has the asymptotics of the form

$$\omega^{\mathrm{sc}}(\lambda,\mu)\simeq\sum_{j,k=1}^{\infty}\omega_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\frac{2k-1}{\nu}}\quad(\lambda^2,\mu^2\to\infty)\,,$$

$$\simeq\sum_{j,k=1}^{\infty}\tilde{\omega}_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\alpha+2k}\quad(\lambda^2\to\infty,\mu^2\to 0)\,.$$

For the function $\omega_{\mathbf{n}}(\zeta,\xi)$:

$$\omega^{\mathrm{sc}}(\lambda,\mu)=\lim\frac{1}{4}\omega_{\mathbf{n}}\Big((Ca)^{\nu}\lambda,(Ca)^{\nu}\mu\Big)$$

has the asymptotics of the form

$$\omega^{\mathrm{sc}}(\lambda,\mu)\simeq\sum_{j,k=1}^{\infty}\omega_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\frac{2k-1}{\nu}}\quad(\lambda^2,\mu^2\to\infty)\,,$$

$$\simeq\sum_{j,k=1}^{\infty}\tilde{\omega}_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\alpha+2k}\quad(\lambda^2\to\infty,\mu^2\to 0)\,.$$

For the function $\omega_{\mathbf{n}}(\zeta,\xi)$:

$$\omega^{\mathrm{sc}}(\lambda,\mu)=\lim\frac{1}{4}\omega_{\mathbf{n}}\Big((Ca)^{\nu}\lambda,(Ca)^{\nu}\mu\Big)$$

has the asymptotics of the form

$$\omega^{\mathrm{sc}}(\lambda,\mu)\simeq\sum_{j,k=1}^{\infty}\omega_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\frac{2k-1}{\nu}}\quad(\lambda^2,\mu^2\to\infty),$$

$$\simeq\sum_{j,k=1}^{\infty}\tilde{\omega}_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\alpha+2k}\quad(\lambda^2\to\infty,\mu^2\to 0).$$

For the function $\omega_{\mathbf{n}}(\zeta,\xi)$:

$$\omega^{\mathrm{sc}}(\lambda,\mu)=\lim\frac{1}{4}\omega_{\mathbf{n}}\Big((Ca)^{\nu}\lambda,(Ca)^{\nu}\mu\Big)$$

has the asymptotics of the form

$$\omega^{\mathrm{sc}}(\lambda,\mu)\simeq\sum_{j,k=1}^{\infty}\omega_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\frac{2k-1}{\nu}}\quad(\lambda^2,\mu^2\to\infty),$$

$$\simeq\sum_{j,k=1}^{\infty}\tilde{\omega}_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\alpha+2k}\quad(\lambda^2\to\infty,\mu^2\to0).$$

For the function $\omega_{\mathbf{n}}(\zeta,\xi)$:

$$\omega^{\mathrm{sc}}(\lambda,\mu)=\lim \frac{1}{4}\omega_{\mathbf{n}}\Big((Ca)^{\nu}\lambda,(Ca)^{\nu}\mu\Big)$$

has the asymptotics of the form

$$\omega^{\mathrm{sc}}(\lambda,\mu)\simeq \sum_{j,k=1}^{\infty}\omega_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\frac{2k-1}{\nu}}\quad (\lambda^2,\mu^2\to\infty)\,,$$

$$\simeq \sum_{j,k=1}^{\infty}\tilde{\omega}_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\alpha+2k}\quad (\lambda^2\to\infty,\mu^2\to 0)\,.$$

For the function $\omega_{\mathbf{n}}(\zeta,\xi)$:

$$\omega^{\mathrm{sc}}(\lambda,\mu)=\lim\frac{1}{4}\omega_{\mathbf{n}}\Big((Ca)^{\nu}\lambda,(Ca)^{\nu}\mu\Big)$$

has the asymptotics of the form

$$\omega^{\mathrm{sc}}(\lambda,\mu)\simeq\sum_{j,k=1}^{\infty}\omega_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\frac{2k-1}{\nu}}\quad(\lambda^2,\mu^2\to\infty),$$

$$\simeq\sum_{j,k=1}^{\infty}\tilde{\omega}_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\alpha+2k}\quad(\lambda^2\to\infty,\mu^2\to 0).$$

For the function $\omega_{\mathbf{n}}(\zeta,\xi)$:

$$\omega^{\mathrm{sc}}(\lambda,\mu)=\lim\frac{1}{4}\omega_{\mathbf{n}}\Big((Ca)^{\nu}\lambda,(Ca)^{\nu}\mu\Big)$$

has the asymptotics of the form

$$\omega^{\mathrm{sc}}(\lambda,\mu)\simeq\sum_{j,k=1}^{\infty}\omega_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\frac{2k-1}{\nu}}\quad(\lambda^2,\mu^2\to\infty),$$

$$\simeq\sum_{j,k=1}^{\infty}\tilde{\omega}_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\alpha+2k}\quad(\lambda^2\to\infty,\mu^2\to 0).$$

For the function $\omega_{\mathbf{n}}(\zeta,\xi)$:

$$\omega^{\mathrm{sc}}(\lambda,\mu)=\lim\frac{1}{4}\omega_{\mathbf{n}}\Big((Ca)^{\nu}\lambda,(Ca)^{\nu}\mu\Big)$$

has the asymptotics of the form

$$\omega^{\mathrm{sc}}(\lambda,\mu)\simeq\sum_{j,k=1}^{\infty}\omega_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\frac{2k-1}{\nu}}\quad(\lambda^2,\mu^2\to\infty),$$

$$\simeq\sum_{j,k=1}^{\infty}\tilde{\omega}_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\alpha+2k}\quad(\lambda^2\to\infty,\mu^2\to 0).$$

For the function $\omega_{\mathbf{n}}(\zeta,\xi)$:

$$\omega^{\mathrm{sc}}(\lambda,\mu)=\lim\frac{1}{4}\omega_{\mathbf{n}}\Big((Ca)^{\nu}\lambda,(Ca)^{\nu}\mu\Big)$$

has the asymptotics of the form

$$\omega^{\mathrm{sc}}(\lambda,\mu)\simeq\sum_{j,k=1}^{\infty}\omega_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\frac{2k-1}{\nu}}\quad(\lambda^2,\mu^2\to\infty),$$

$$\simeq\sum_{j,k=1}^{\infty}\tilde{\omega}_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\alpha+2k}\quad(\lambda^2\to\infty,\mu^2\to 0).$$

For the function $\omega_{\mathbf{n}}(\zeta,\xi)$:

$$\omega^{\mathrm{sc}}(\lambda,\mu)=\lim\frac{1}{4}\omega_{\mathbf{n}}\Big(\big(Ca\big)^{\nu}\lambda,\big(Ca\big)^{\nu}\mu\Big)$$

has the asymptotics of the form

$$\omega^{\mathrm{sc}}(\lambda,\mu)\simeq\sum_{j,k=1}^{\infty}\omega_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\frac{2k-1}{\nu}}\quad(\lambda^2,\mu^2\to\infty),$$

$$\simeq\sum_{j,k=1}^{\infty}\tilde{\omega}_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\alpha+2k}\quad(\lambda^2\to\infty,\mu^2\to0).$$

For the function $\omega_{\mathbf{n}}(\zeta,\xi)$:

$$\omega^{\mathrm{sc}}(\lambda,\mu) = \lim \frac{1}{4}\omega_{\mathbf{n}}\Big((Ca)^{\nu}\lambda,(Ca)^{\nu}\mu\Big)$$

has the asymptotics of the form

$$\omega^{\mathrm{sc}}(\lambda,\mu) \simeq \sum_{j,k=1}^{\infty}\omega_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\frac{2k-1}{\nu}} \quad (\lambda^2,\mu^2\to\infty)\,,$$

$$\simeq \sum_{j,k=1}^{\infty}\tilde{\omega}_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\alpha+2k} \quad (\lambda^2\to\infty,\mu^2\to 0)\,.$$

For the function $\omega_{\mathbf{n}}(\zeta,\xi)$:

$$\omega^{\rm sc}(\lambda,\mu)=\lim\frac{1}{4}\omega_{\mathbf{n}}\Big(\left(Ca\right)^{\nu}\lambda,\left(Ca\right)^{\nu}\mu\Big)$$

has the asymptotics of the form

$$\begin{aligned}\omega^{\rm sc}(\lambda,\mu)&\simeq\sum_{j,k=1}^{\infty}\omega_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\frac{2k-1}{\nu}}\quad(\lambda^2,\mu^2\to\infty),\\&\simeq\sum_{j,k=1}^{\infty}\tilde{\omega}_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\alpha+2k}\quad(\lambda^2\to\infty,\mu^2\to0).\end{aligned}$$

For the function $\omega_{\mathbf{n}}(\zeta, \xi)$:

$$\omega^{\mathrm{sc}}(\lambda, \mu) = \lim \frac{1}{4}\omega_{\mathbf{n}}\Big((Ca)^{\nu}\lambda, (Ca)^{\nu}\mu\Big)$$

has the asymptotics of the form

$$\omega^{\mathrm{sc}}(\lambda, \mu) \simeq \sum_{j,k=1}^{\infty} \omega_{j,k}(\kappa, \alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\frac{2k-1}{\nu}} \quad (\lambda^2, \mu^2 \to \infty),$$

$$\simeq \sum_{j,k=1}^{\infty} \tilde{\omega}_{j,k}(\kappa, \alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\alpha+2k} \quad (\lambda^2 \to \infty, \mu^2 \to 0).$$

For the function $\omega_{\mathbf{n}}(\zeta,\xi)$:

$$\omega^{\mathrm{sc}}(\lambda,\mu)=\lim\frac{1}{4}\omega_{\mathbf{n}}\Big((Ca)^{\nu}\lambda,(Ca)^{\nu}\mu\Big)$$

has the asymptotics of the form

$$\omega^{\mathrm{sc}}(\lambda,\mu)\simeq\sum_{j,k=1}^{\infty}\omega_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\frac{2k-1}{\nu}}\quad(\lambda^2,\mu^2\to\infty)\,,$$

$$\simeq\sum_{j,k=1}^{\infty}\tilde{\omega}_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\alpha+2k}\quad(\lambda^2\to\infty,\mu^2\to 0)\,.$$

For the function $\omega_{\mathbf{n}}(\zeta,\xi)$:

$$\omega^{\mathrm{sc}}(\lambda,\mu)=\lim\frac{1}{4}\omega_{\mathbf{n}}\Big((Ca)^{\nu}\lambda,(Ca)^{\nu}\mu\Big)$$

has the asymptotics of the form

$$\omega^{\mathrm{sc}}(\lambda,\mu)\simeq\sum_{j,k=1}^{\infty}\omega_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\frac{2k-1}{\nu}}\quad(\lambda^2,\mu^2\to\infty),$$

$$\simeq\sum_{j,k=1}^{\infty}\tilde{\omega}_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\alpha+2k}\quad(\lambda^2\to\infty,\mu^2\to 0).$$

For the function $\omega_{\mathbf{n}}(\zeta,\xi)$:

$$\omega^{\mathrm{sc}}(\lambda,\mu)=\lim\frac{1}{4}\omega_{\mathbf{n}}\Big((Ca)^{\nu}\lambda,(Ca)^{\nu}\mu\Big)$$

has the asymptotics of the form

$$\omega^{\mathrm{sc}}(\lambda,\mu)\simeq\sum_{j,k=1}^{\infty}\omega_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\frac{2k-1}{\nu}}\quad(\lambda^2,\mu^2\to\infty)\,,$$

$$\simeq\sum_{j,k=1}^{\infty}\tilde{\omega}_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\alpha+2k}\quad(\lambda^2\to\infty,\mu^2\to 0)\,.$$

For the function $\omega_{\mathbf{n}}(\zeta,\xi)$:

$$\omega^{\mathrm{sc}}(\lambda,\mu)=\lim \frac{1}{4}\omega_{\mathbf{n}}\Big((Ca)^{\nu}\lambda,(Ca)^{\nu}\mu\Big)$$

has the asymptotics of the form

$$\omega^{\mathrm{sc}}(\lambda,\mu)\simeq\sum_{j,k=1}^{\infty}\omega_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\frac{2k-1}{\nu}}\quad(\lambda^2,\mu^2\to\infty),$$

$$\simeq\sum_{j,k=1}^{\infty}\tilde{\omega}_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\alpha+2k}\quad(\lambda^2\to\infty,\mu^2\to 0).$$

We postulate that the coefficients in these expansions are some three point functions in CFT.

For the function $\omega_{\mathbf{n}}(\zeta,\xi)$:

$$\omega^{\mathrm{sc}}(\lambda,\mu)=\lim\frac{1}{4}\omega_{\mathbf{n}}\Big((Ca)^{\nu}\lambda,(Ca)^{\nu}\mu\Big)$$

has the asymptotics of the form

$$\omega^{\mathrm{sc}}(\lambda,\mu)\simeq\sum_{j,k=1}^{\infty}\omega_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\frac{2k-1}{\nu}}\quad(\lambda^2,\mu^2\to\infty),$$

$$\simeq\sum_{j,k=1}^{\infty}\tilde{\omega}_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\alpha+2k}\quad(\lambda^2\to\infty,\mu^2\to 0).$$

We postulate that the coefficients in these expansions are some three point functions in CFT.

For the function $\omega_{\mathbf{n}}(\zeta,\xi)$:

$$\omega^{\mathrm{sc}}(\lambda,\mu)=\lim\frac{1}{4}\omega_{\mathbf{n}}\Big((Ca)^{\nu}\lambda,(Ca)^{\nu}\mu\Big)$$

has the asymptotics of the form

$$\omega^{\mathrm{sc}}(\lambda,\mu)\simeq\sum_{j,k=1}^{\infty}\omega_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\frac{2k-1}{\nu}}\quad(\lambda^2,\mu^2\to\infty),$$

$$\simeq\sum_{j,k=1}^{\infty}\tilde{\omega}_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\alpha+2k}\quad(\lambda^2\to\infty,\mu^2\to 0).$$

We postulate that the coefficients in these expansions are some three point functions in CFT.

For the function $\omega_{\mathbf{n}}(\zeta,\xi)$:

$$\omega^{\mathrm{sc}}(\lambda,\mu)=\lim\frac{1}{4}\omega_{\mathbf{n}}\Big(({\sf C}a)^{\nu}\lambda,({\sf C}a)^{\nu}\mu\Big)$$

has the asymptotics of the form

$$\omega^{\mathrm{sc}}(\lambda,\mu)\simeq\sum_{j,k=1}^{\infty}\omega_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\frac{2k-1}{\nu}}\quad(\lambda^2,\mu^2\to\infty),$$
$$\simeq\sum_{j,k=1}^{\infty}\tilde{\omega}_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\alpha+2k}\quad(\lambda^2\to\infty,\mu^2\to 0).$$

We postulate that the coefficients in these expansions are some three point functions in CFT.

For the function $\omega_{\mathbf{n}}(\zeta,\xi)$:

$$\omega^{\mathrm{sc}}(\lambda,\mu) = \lim \frac{1}{4}\omega_{\mathbf{n}}\Big((Ca)^{\nu}\lambda,(Ca)^{\nu}\mu\Big)$$

has the asymptotics of the form

$$\omega^{\mathrm{sc}}(\lambda,\mu) \simeq \sum_{j,k=1}^{\infty}\omega_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\frac{2k-1}{\nu}} \quad (\lambda^2,\mu^2\to\infty)\,,$$

$$\simeq \sum_{j,k=1}^{\infty}\tilde{\omega}_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\alpha+2k} \quad (\lambda^2\to\infty,\mu^2\to 0)\,.$$

We postulate that the coefficients in these expansions are some three point functions in CFT.

For the function $\omega_{\mathbf{n}}(\zeta,\xi)$:

$$\omega^{\mathrm{sc}}(\lambda,\mu)=\lim\frac{1}{4}\omega_{\mathbf{n}}\Big((Ca)^{\nu}\lambda,(Ca)^{\nu}\mu\Big)$$

has the asymptotics of the form

$$\omega^{\mathrm{sc}}(\lambda,\mu)\simeq\sum_{j,k=1}^{\infty}\omega_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\frac{2k-1}{\nu}}\quad(\lambda^2,\mu^2\to\infty),$$

$$\simeq\sum_{j,k=1}^{\infty}\tilde{\omega}_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\alpha+2k}\quad(\lambda^2\to\infty,\mu^2\to 0).$$

We postulate that the coefficients in these expansions are some three point functions in CFT.

For the function $\omega_{\mathbf{n}}(\zeta,\xi)$:

$$\omega^{\rm sc}(\lambda,\mu)=\lim\frac{1}{4}\omega_{\mathbf{n}}\Big(\big(Ca\big)^{\nu}\lambda,\big(Ca\big)^{\nu}\mu\Big)$$

has the asymptotics of the form

$$\omega^{\rm sc}(\lambda,\mu)\simeq\sum_{j,k=1}^{\infty}\omega_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\frac{2k-1}{\nu}}\quad(\lambda^2,\mu^2\to\infty),$$

$$\simeq\sum_{j,k=1}^{\infty}\tilde{\omega}_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\alpha+2k}\quad(\lambda^2\to\infty,\mu^2\to 0).$$

We postulate that the coefficients in these expansions are some three point functions in CFT.

For the function $\omega_{\mathbf{n}}(\zeta,\xi)$:

$$\omega^{\mathrm{sc}}(\lambda,\mu)=\lim\frac{1}{4}\omega_{\mathbf{n}}\Big((Ca)^{\nu}\lambda,(Ca)^{\nu}\mu\Big)$$

has the asymptotics of the form

$$\omega^{\mathrm{sc}}(\lambda,\mu)\simeq\sum_{j,k=1}^{\infty}\omega_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\frac{2k-1}{\nu}}\quad(\lambda^2,\mu^2\to\infty)\,,$$

$$\simeq\sum_{j,k=1}^{\infty}\tilde{\omega}_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\alpha+2k}\quad(\lambda^2\to\infty,\mu^2\to 0)\,.$$

We postulate that the coefficients in these expansions are some three point functions in CFT.

For the function $\omega_{\mathbf{n}}(\zeta,\xi)$:

$$\omega^{\mathrm{sc}}(\lambda,\mu)=\lim\frac{1}{4}\omega_{\mathbf{n}}\Big((Ca)^{\nu}\lambda,(Ca)^{\nu}\mu\Big)$$

has the asymptotics of the form

$$\omega^{\mathrm{sc}}(\lambda,\mu)\simeq\sum_{j,k=1}^{\infty}\omega_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\frac{2k-1}{\nu}}\quad(\lambda^2,\mu^2\to\infty)\,,$$

$$\simeq\sum_{j,k=1}^{\infty}\tilde{\omega}_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\alpha+2k}\quad(\lambda^2\to\infty,\mu^2\to 0)\,.$$

We postulate that the coefficients in these expansions are some three point functions in CFT.

For the function $\omega_{\mathbf{n}}(\zeta,\xi)$:

$$\omega^{\mathrm{sc}}(\lambda,\mu)=\lim\frac{1}{4}\omega_{\mathbf{n}}\Big((Ca)^{\nu}\lambda,(Ca)^{\nu}\mu\Big)$$

has the asymptotics of the form

$$\omega^{\mathrm{sc}}(\lambda,\mu)\simeq\sum_{j,k=1}^{\infty}\omega_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\frac{2k-1}{\nu}}\quad(\lambda^2,\mu^2\to\infty)\,,$$

$$\simeq\sum_{j,k=1}^{\infty}\tilde{\omega}_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\alpha+2k}\quad(\lambda^2\to\infty,\mu^2\to 0)\,.$$

We postulate that the coefficients in these expansions are some three point functions in CFT.

For the function $\omega_{\mathbf{n}}(\zeta,\xi)$:

$$\omega^{\mathrm{sc}}(\lambda,\mu)=\lim\frac{1}{4}\omega_{\mathbf{n}}\Big((Ca)^{\nu}\lambda,(Ca)^{\nu}\mu\Big)$$

has the asymptotics of the form

$$\omega^{\mathrm{sc}}(\lambda,\mu)\simeq\sum_{j,k=1}^{\infty}\omega_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\frac{2k-1}{\nu}}\quad(\lambda^2,\mu^2\to\infty)\,,$$

$$\simeq\sum_{j,k=1}^{\infty}\tilde{\omega}_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\alpha+2k}\quad(\lambda^2\to\infty,\mu^2\to 0)\,.$$

We postulate that the coefficients in these expansions are some three point functions in CFT.

For the function $\omega_{\mathbf{n}}(\zeta,\xi)$:

$$\omega^{\mathrm{sc}}(\lambda,\mu)=\lim\frac{1}{4}\omega_{\mathbf{n}}\Big((Ca)^{\nu}\lambda,(Ca)^{\nu}\mu\Big)$$

has the asymptotics of the form

$$\omega^{\mathrm{sc}}(\lambda,\mu)\simeq\sum_{j,k=1}^{\infty}\omega_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\frac{2k-1}{\nu}}\quad(\lambda^2,\mu^2\to\infty),$$

$$\simeq\sum_{j,k=1}^{\infty}\tilde{\omega}_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\alpha+2k}\quad(\lambda^2\to\infty,\mu^2\to 0).$$

We postulate that the coefficients in these expansions are some three point functions in CFT.

For the function $\omega_{\mathbf{n}}(\zeta,\xi)$:

$$\omega^{\mathrm{sc}}(\lambda,\mu)=\lim\frac{1}{4}\omega_{\mathbf{n}}\Big((Ca)^{\nu}\lambda,(Ca)^{\nu}\mu\Big)$$

has the asymptotics of the form

$$\omega^{\mathrm{sc}}(\lambda,\mu)\simeq\sum_{j,k=1}^{\infty}\omega_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\frac{2k-1}{\nu}}\quad(\lambda^2,\mu^2\to\infty)\,,$$

$$\simeq\sum_{j,k=1}^{\infty}\tilde{\omega}_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\alpha+2k}\quad(\lambda^2\to\infty,\mu^2\to 0)\,.$$

We postulate that the coefficients in these expansions are some three point functions in CFT.

For the function $\omega_{\mathbf{n}}(\zeta,\xi)$:

$$\omega^{\mathrm{sc}}(\lambda,\mu)=\lim\frac{1}{4}\omega_{\mathbf{n}}\Big((Ca)^{\nu}\lambda,(Ca)^{\nu}\mu\Big)$$

has the asymptotics of the form

$$\omega^{\mathrm{sc}}(\lambda,\mu)\simeq\sum_{j,k=1}^{\infty}\omega_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\frac{2k-1}{\nu}}\quad(\lambda^2,\mu^2\to\infty)\,,$$

$$\simeq\sum_{j,k=1}^{\infty}\tilde{\omega}_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\alpha+2k}\quad(\lambda^2\to\infty,\mu^2\to 0)\,.$$

We postulate that the coefficients in these expansions are some three point functions in CFT.

For the function $\omega_{\mathbf{n}}(\zeta,\xi)$:

$$\omega^{\mathrm{sc}}(\lambda,\mu)=\lim\frac{1}{4}\omega_{\mathbf{n}}\Big((Ca)^{\nu}\lambda,(Ca)^{\nu}\mu\Big)$$

has the asymptotics of the form

$$\omega^{\mathrm{sc}}(\lambda,\mu)\simeq\sum_{j,k=1}^{\infty}\omega_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\frac{2k-1}{\nu}}\quad(\lambda^2,\mu^2\to\infty)\,,$$

$$\simeq\sum_{j,k=1}^{\infty}\tilde{\omega}_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\alpha+2k}\quad(\lambda^2\to\infty,\mu^2\to0)\,.$$

We postulate that the coefficients in these expansions are some three point functions in CFT.

For the function $\omega_{\mathbf{n}}(\zeta,\xi)$:

$$\omega^{\mathrm{sc}}(\lambda,\mu)=\lim\frac{1}{4}\omega_{\mathbf{n}}\Big((Ca)^{\nu}\lambda,(Ca)^{\nu}\mu\Big)$$

has the asymptotics of the form

$$\omega^{\mathrm{sc}}(\lambda,\mu)\simeq\sum_{j,k=1}^{\infty}\omega_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\frac{2k-1}{\nu}}\quad(\lambda^2,\mu^2\to\infty),$$

$$\simeq\sum_{j,k=1}^{\infty}\tilde{\omega}_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\alpha+2k}\quad(\lambda^2\to\infty,\mu^2\to 0).$$

We postulate that the coefficients in these expansions are some three point functions in CFT.

For the function $\omega_{\mathbf{n}}(\zeta,\xi)$:

$$\omega^{\mathrm{sc}}(\lambda,\mu)=\lim\frac{1}{4}\omega_{\mathbf{n}}\Big((Ca)^{\nu}\lambda,(Ca)^{\nu}\mu\Big)$$

has the asymptotics of the form

$$\omega^{\mathrm{sc}}(\lambda,\mu)\simeq\sum_{j,k=1}^{\infty}\omega_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\frac{2k-1}{\nu}}\quad(\lambda^2,\mu^2\to\infty)\,,$$

$$\simeq\sum_{j,k=1}^{\infty}\tilde{\omega}_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\alpha+2k}\quad(\lambda^2\to\infty,\mu^2\to 0)\,.$$

We postulate that the coefficients in these expansions are some three point functions in CFT.

For the function $\omega_{\mathbf{n}}(\zeta,\xi)$:

$$\omega^{\rm sc}(\lambda,\mu)=\lim\frac{1}{4}\omega_{\mathbf{n}}\Big((Ca)^{\nu}\lambda,(Ca)^{\nu}\mu\Big)$$

has the asymptotics of the form

$$\omega^{\rm sc}(\lambda,\mu)\simeq\sum_{j,k=1}^{\infty}\omega_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\frac{2k-1}{\nu}}\quad(\lambda^2,\mu^2\to\infty)\,,$$

$$\simeq\sum_{j,k=1}^{\infty}\tilde{\omega}_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\alpha+2k}\quad(\lambda^2\to\infty,\mu^2\to0)\,.$$

We postulate that the coefficients in these expansions are some three point functions in CFT.

For the function $\omega_{\mathbf{n}}(\zeta,\xi)$:

$$\omega^{\mathrm{sc}}(\lambda,\mu)=\lim\frac{1}{4}\omega_{\mathbf{n}}\Big((Ca)^{\nu}\lambda,(Ca)^{\nu}\mu\Big)$$

has the asymptotics of the form

$$\omega^{\mathrm{sc}}(\lambda,\mu)\simeq\sum_{j,k=1}^{\infty}\omega_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\frac{2k-1}{\nu}}\quad(\lambda^2,\mu^2\to\infty)\,,$$

$$\simeq\sum_{j,k=1}^{\infty}\tilde{\omega}_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\alpha+2k}\quad(\lambda^2\to\infty,\mu^2\to 0)\,.$$

We postulate that the coefficients in these expansions are some three point functions in CFT.

For the function $\omega_{\mathbf{n}}(\zeta,\xi)$:

$$\omega^{\mathrm{sc}}(\lambda,\mu)=\lim\frac{1}{4}\omega_{\mathbf{n}}\Big((Ca)^{\nu}\lambda,(Ca)^{\nu}\mu\Big)$$

has the asymptotics of the form

$$\omega^{\mathrm{sc}}(\lambda,\mu)\simeq\sum_{j,k=1}^{\infty}\omega_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\frac{2k-1}{\nu}}\quad(\lambda^2,\mu^2\to\infty)\,,$$

$$\simeq\sum_{j,k=1}^{\infty}\tilde{\omega}_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\alpha+2k}\quad(\lambda^2\to\infty,\mu^2\to 0)\,.$$

We postulate that the coefficients in these expansions are some three point functions in CFT.

Conjecture(CFT)

Conjecture(CFT)

- The following limit exists in the weak sense:

$$\beta^*(\lambda) = \lim \frac{1}{2}\mathbf{b}^*\Big((Ca)^\nu\lambda\Big) \simeq \sum_{j=1}^{\infty} \beta^*_{2j-1}\lambda^{-\frac{2j-1}{\nu}},$$

$$\gamma^*(\lambda) = \lim \frac{1}{2}\mathbf{c}^*\Big((Ca)^\nu\lambda\Big) \simeq \sum_{j=1}^{\infty} \gamma^*_{2j-1}\lambda^{-\frac{2j-1}{\nu}}.$$

Conjecture(CFT)

- The following limit exists in the weak sense:

$$\beta^*(\lambda) = \lim \frac{1}{2}\mathbf{b}^*\Big((Ca)^\nu\lambda\Big) \simeq \sum_{j=1}^{\infty} \beta^*_{2j-1}\lambda^{-\frac{2j-1}{\nu}},$$

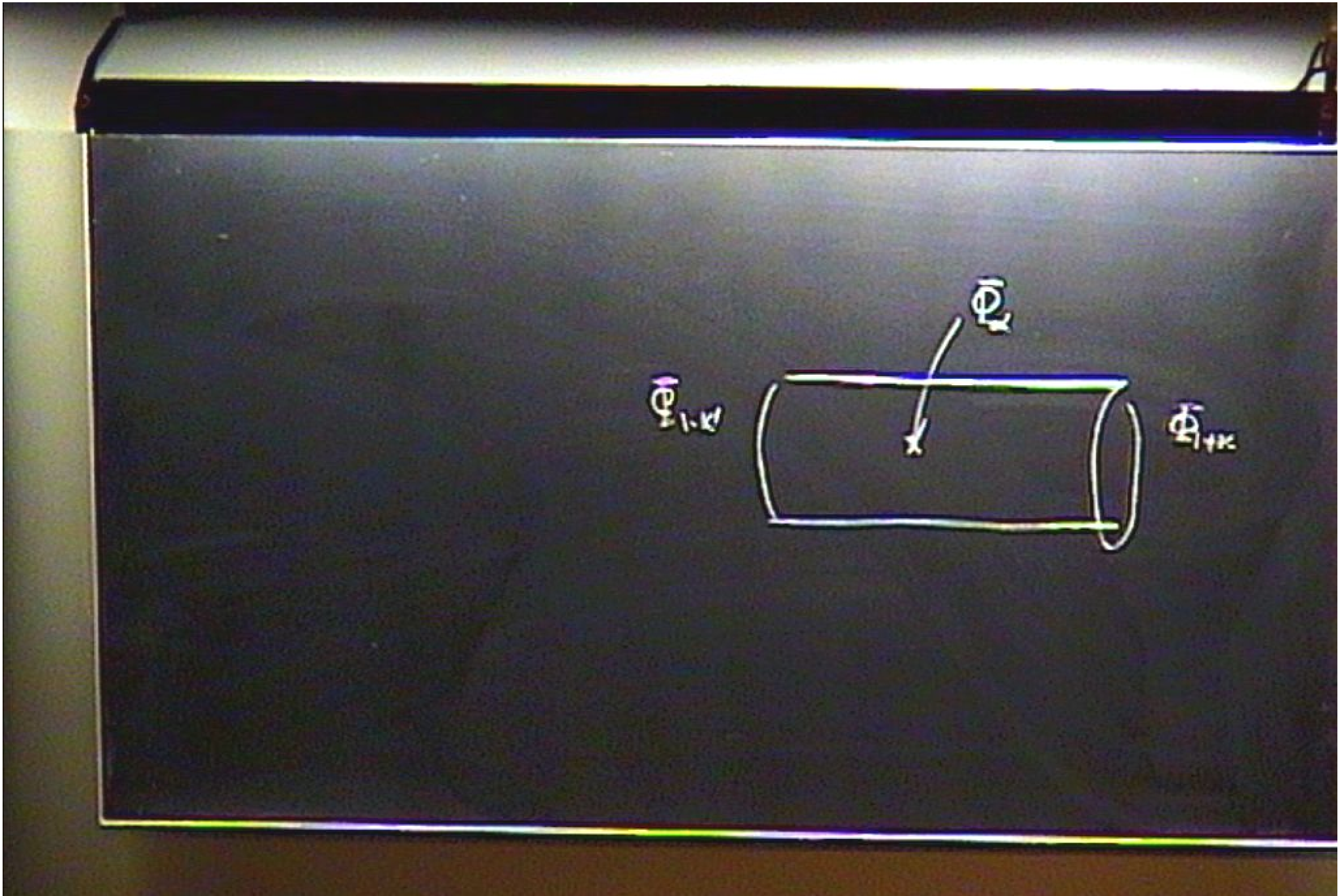
$$\gamma^*(\lambda) = \lim \frac{1}{2}\mathbf{c}^*\Big((Ca)^\nu\lambda\Big) \simeq \sum_{j=1}^{\infty} \gamma^*_{2j-1}\lambda^{-\frac{2j-1}{\nu}}.$$

Conjecture(CFT)

- The following limit exists in the weak sense:

$$\beta^*(\lambda) = \lim \frac{1}{2}\mathbf{b}^*\Big(\big(Ca\big)^{\nu}\lambda\Big) \simeq \sum_{j=1}^{\infty} \beta^*_{2j-1}\lambda^{-\frac{2j-1}{\nu}},$$

$$\gamma^*(\lambda) = \lim \frac{1}{2}\mathbf{c}^*\Big(\big(Ca\big)^{\nu}\lambda\Big) \simeq \sum_{j=1}^{\infty} \gamma^*_{2j-1}\lambda^{-\frac{2j-1}{\nu}}.$$



Conjecture(CFT)

- The following limit exists in the weak sense:

$$\beta^*(\lambda) = \lim \frac{1}{2}\mathbf{b}^*\Big((Ca)^\nu \lambda\Big) \simeq \sum_{j=1}^{\infty} \beta^*_{2j-1}\lambda^{-\frac{2j-1}{\nu}},$$

$$\gamma^*(\lambda) = \lim \frac{1}{2}\mathbf{c}^*\Big((Ca)^\nu \lambda\Big) \simeq \sum_{j=1}^{\infty} \gamma^*_{2j-1}\lambda^{-\frac{2j-1}{\nu}}.$$

Conjecture(CFT)

- The following limit exists in the weak sense:

$$\beta^*(\lambda) = \lim \frac{1}{2}\mathbf{b}^*\Big(((Ca)^\nu\lambda\Big) \simeq \sum_{j=1}^{\infty} \beta^*_{2j-1}\lambda^{-\frac{2j-1}{\nu}},$$

$$\gamma^*(\lambda) = \lim \frac{1}{2}\mathbf{c}^*\Big(((Ca)^\nu\lambda\Big) \simeq \sum_{j=1}^{\infty} \gamma^*_{2j-1}\lambda^{-\frac{2j-1}{\nu}}.$$

Conjecture(CFT)

- The following limit exists in the weak sense:

$$\beta^*(\lambda) = \lim \frac{1}{2}\mathbf{b}^*\left((Ca)^\nu \lambda\right) \simeq \sum_{j=1}^{\infty} \beta^*_{2j-1}\lambda^{-\frac{2j-1}{\nu}},$$

$$\gamma^*(\lambda) = \lim \frac{1}{2}\mathbf{c}^*\left((Ca)^\nu \lambda\right) \simeq \sum_{j=1}^{\infty} \gamma^*_{2j-1}\lambda^{-\frac{2j-1}{\nu}}.$$

- The set $\{\beta^*_{I^+}\gamma^*_{I^-}\Phi_\alpha\}$ is a basis of the space of chiral descendants modulo integrals of motion.

Conjecture(CFT)

- The following limit exists in the weak sense:

$$\beta^*(\lambda) = \lim \frac{1}{2}\mathbf{b}^*\Big((Ca)^\nu\lambda\Big) \simeq \sum_{j=1}^{\infty} \beta^*_{2j-1}\lambda^{-\frac{2j-1}{\nu}},$$

$$\gamma^*(\lambda) = \lim \frac{1}{2}\mathbf{c}^*\Big((Ca)^\nu\lambda\Big) \simeq \sum_{j=1}^{\infty} \gamma^*_{2j-1}\lambda^{-\frac{2j-1}{\nu}}.$$

- The set $\{\beta^*_{I^+}\gamma^*_{I^-}\Phi_\alpha\}$ is a basis of the space of chiral descendants modulo integrals of motion.

Conjecture(CFT)

- The following limit exists in the weak sense:

$$\beta^*(\lambda) = \lim \frac{1}{2}\mathbf{b}^*\Big((Ca)^\nu \lambda\Big) \simeq \sum_{j=1}^{\infty} \beta^*_{2j-1} \lambda^{-\frac{2j-1}{\nu}},$$

$$\gamma^*(\lambda) = \lim \frac{1}{2}\mathbf{c}^*\Big((Ca)^\nu \lambda\Big) \simeq \sum_{j=1}^{\infty} \gamma^*_{2j-1} \lambda^{-\frac{2j-1}{\nu}}.$$

- The set $\{\beta^*_{I^+}\gamma^*_{I^-}\Phi_\alpha\}$ is a basis of the space of chiral descendants modulo integrals of motion.

Conjecture(CFT)

- The following limit exists in the weak sense:

$$\beta^*(\lambda) = \lim \frac{1}{2}\mathbf{b}^*\Big((Ca)^{\nu}\lambda\Big) \simeq \sum_{j=1}^{\infty} \beta^*_{2j-1}\lambda^{-\frac{2j-1}{\nu}},$$

$$\gamma^*(\lambda) = \lim \frac{1}{2}\mathbf{c}^*\Big((Ca)^{\nu}\lambda\Big) \simeq \sum_{j=1}^{\infty} \gamma^*_{2j-1}\lambda^{-\frac{2j-1}{\nu}}.$$

- The set $\{\beta^*_{I^+}\gamma^*_{I^-}\Phi_\alpha\}$ is a basis of the space of chiral descendants modulo integrals of motion.

Conjecture(CFT)

- The following limit exists in the weak sense:

$$\beta^*(\lambda) = \lim \frac{1}{2}\mathbf{b}^*\Big((Ca)^{\nu}\lambda\Big) \simeq \sum_{j=1}^{\infty} \beta^*_{2j-1}\lambda^{-\frac{2j-1}{\nu}},$$

$$\gamma^*(\lambda) = \lim \frac{1}{2}\mathbf{c}^*\Big((Ca)^{\nu}\lambda\Big) \simeq \sum_{j=1}^{\infty} \gamma^*_{2j-1}\lambda^{-\frac{2j-1}{\nu}}.$$

- The set $\{\beta^*_{I^+}\gamma^*_{I^-}\Phi_\alpha\}$ is a basis of the space of chiral descendants modulo integrals of motion.

Conjecture(CFT)

- The following limit exists in the weak sense:

$$\beta^*(\lambda) = \lim \frac{1}{2}\mathbf{b}^*\Big((Ca)^\nu \lambda\Big) \simeq \sum_{j=1}^{\infty} \beta^*_{2j-1} \lambda^{-\frac{2j-1}{\nu}},$$

$$\gamma^*(\lambda) = \lim \frac{1}{2}\mathbf{c}^*\Big((Ca)^\nu \lambda\Big) \simeq \sum_{j=1}^{\infty} \gamma^*_{2j-1} \lambda^{-\frac{2j-1}{\nu}}.$$

- The set $\{\beta^*_{I^+}\gamma^*_{I^-}\Phi_\alpha\}$ is a basis of the space of chiral descendants modulo integrals of motion.

Conjecture(CFT)

- The following limit exists in the weak sense:

$$\beta^*(\lambda) = \lim \frac{1}{2}\mathbf{b}^*\Big(((Ca)^\nu\lambda\Big) \simeq \sum_{j=1}^{\infty} \beta^*_{2j-1}\lambda^{-\frac{2j-1}{\nu}},$$

$$\gamma^*(\lambda) = \lim \frac{1}{2}\mathbf{c}^*\Big(((Ca)^\nu\lambda\Big) \simeq \sum_{j=1}^{\infty} \gamma^*_{2j-1}\lambda^{-\frac{2j-1}{\nu}}.$$

- The set $\{\beta^*_{I^+}\gamma^*_{I^-}\Phi_\alpha\}$ is a basis of the space of chiral descendants modulo integrals of motion.
- The Wick contraction rule applies with the pairing

$$\omega_{j,k}(\kappa,\alpha) = \frac{\langle 1-\kappa|\beta^*_{2j-1}\gamma^*_{2k-1}\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle}.$$

Conjecture(CFT)

- The following limit exists in the weak sense:

$$\beta^*(\lambda) = \lim \frac{1}{2}\mathbf{b}^*\Big((Ca)^\nu\lambda\Big) \simeq \sum_{j=1}^{\infty} \beta^*_{2j-1}\lambda^{-\frac{2j-1}{\nu}},$$

$$\gamma^*(\lambda) = \lim \frac{1}{2}\mathbf{c}^*\Big((Ca)^\nu\lambda\Big) \simeq \sum_{j=1}^{\infty} \gamma^*_{2j-1}\lambda^{-\frac{2j-1}{\nu}}.$$

- The set $\{\beta^*_{I^+}\gamma^*_{I^-}\Phi_\alpha\}$ is a basis of the space of chiral descendants modulo integrals of motion.
- The Wick contraction rule applies with the pairing

$$\omega_{j,k}(\kappa,\alpha) = \frac{\langle 1-\kappa|\beta^*_{2j-1}\gamma^*_{2k-1}\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle}.$$

Conjecture(CFT)

- The following limit exists in the weak sense:

$$\beta^*(\lambda) = \lim \frac{1}{2}\mathbf{b}^*\Big((Ca)^\nu\lambda\Big) \simeq \sum_{j=1}^{\infty} \beta^*_{2j-1}\lambda^{-\frac{2j-1}{\nu}},$$

$$\gamma^*(\lambda) = \lim \frac{1}{2}\mathbf{c}^*\Big((Ca)^\nu\lambda\Big) \simeq \sum_{j=1}^{\infty} \gamma^*_{2j-1}\lambda^{-\frac{2j-1}{\nu}}.$$

- The set $\{\beta^*_{I^+}\gamma^*_{I^-}\Phi_\alpha\}$ is a basis of the space of chiral descendants modulo integrals of motion.
- The Wick contraction rule applies with the pairing

$$\omega_{j,k}(\kappa,\alpha) = \frac{\langle 1-\kappa|\beta^*_{2j-1}\gamma^*_{2k-1}\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle}.$$

Conjecture(CFT)

- The following limit exists in the weak sense:

$$\beta^*(\lambda) = \lim \frac{1}{2}\mathbf{b}^*\Big((Ca)^{\nu}\lambda\Big) \simeq \sum_{j=1}^{\infty} \beta^*_{2j-1}\lambda^{-\frac{2j-1}{\nu}},$$

$$\gamma^*(\lambda) = \lim \frac{1}{2}\mathbf{c}^*\Big((Ca)^{\nu}\lambda\Big) \simeq \sum_{j=1}^{\infty} \gamma^*_{2j-1}\lambda^{-\frac{2j-1}{\nu}}.$$

- The set $\{\beta^*_{I^+}\gamma^*_{I^-}\Phi_\alpha\}$ is a basis of the space of chiral descendants modulo integrals of motion.
- The Wick contraction rule applies with the pairing

$$\omega_{j,k}(\kappa,\alpha) = \frac{\langle 1-\kappa|\beta^*_{2j-1}\gamma^*_{2k-1}\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle}.$$

Conjecture(CFT)

- The following limit exists in the weak sense:

$$\beta^*(\lambda) = \lim \frac{1}{2}\mathbf{b}^*\Big((Ca)^\nu \lambda\Big) \simeq \sum_{j=1}^{\infty} \beta^*_{2j-1} \lambda^{-\frac{2j-1}{\nu}} ,$$

$$\gamma^*(\lambda) = \lim \frac{1}{2}\mathbf{c}^*\Big((Ca)^\nu \lambda\Big) \simeq \sum_{j=1}^{\infty} \gamma^*_{2j-1} \lambda^{-\frac{2j-1}{\nu}} .$$

- The set $\{\beta^*_{I^+}\gamma^*_{I^-}\Phi_\alpha\}$ is a basis of the space of chiral descendants modulo integrals of motion.
- The Wick contraction rule applies with the pairing

$$\omega_{j,k}(\kappa,\alpha) = \frac{\langle 1-\kappa|\beta^*_{2j-1}\gamma^*_{2k-1}\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle} .$$

Conjecture(CFT)

- The following limit exists in the weak sense:

$$\beta^*(\lambda) = \lim \frac{1}{2}\mathbf{b}^*\Big((Ca)^\nu\lambda\Big) \simeq \sum_{j=1}^{\infty} \beta^*_{2j-1}\lambda^{-\frac{2j-1}{\nu}},$$

$$\gamma^*(\lambda) = \lim \frac{1}{2}\mathbf{c}^*\Big((Ca)^\nu\lambda\Big) \simeq \sum_{j=1}^{\infty} \gamma^*_{2j-1}\lambda^{-\frac{2j-1}{\nu}}.$$

- The set $\{\beta^*_{I^+}\gamma^*_{I^-}\Phi_\alpha\}$ is a basis of the space of chiral descendants modulo integrals of motion.
- The Wick contraction rule applies with the pairing

$$\omega_{j,k}(\kappa,\alpha) = \frac{\langle 1-\kappa|\beta^*_{2j-1}\gamma^*_{2k-1}\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle}.$$

Conjecture(CFT)

- The following limit exists in the weak sense:

$$\beta^*(\lambda) = \lim \frac{1}{2}\mathbf{b}^*\Big((Ca)^\nu\lambda\Big) \simeq \sum_{j=1}^{\infty} \beta^*_{2j-1}\lambda^{-\frac{2j-1}{\nu}},$$

$$\gamma^*(\lambda) = \lim \frac{1}{2}\mathbf{c}^*\Big((Ca)^\nu\lambda\Big) \simeq \sum_{j=1}^{\infty} \gamma^*_{2j-1}\lambda^{-\frac{2j-1}{\nu}}.$$

- The set $\{\beta^*_{I^+}\gamma^*_{I^-}\Phi_\alpha\}$ is a basis of the space of chiral descendants modulo integrals of motion.
- The Wick contraction rule applies with the pairing

$$\omega_{j,k}(\kappa,\alpha) = \frac{\langle 1-\kappa|\beta^*_{2j-1}\gamma^*_{2k-1}\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle}.$$

Conjecture(CFT)

- The following limit exists in the weak sense:

$$\beta^*(\lambda) = \lim \frac{1}{2}\mathbf{b}^*\Big((Ca)^\nu \lambda\Big) \simeq \sum_{j=1}^{\infty} \beta^*_{2j-1} \lambda^{-\frac{2j-1}{\nu}},$$

$$\gamma^*(\lambda) = \lim \frac{1}{2}\mathbf{c}^*\Big((Ca)^\nu \lambda\Big) \simeq \sum_{j=1}^{\infty} \gamma^*_{2j-1} \lambda^{-\frac{2j-1}{\nu}}.$$

- The set $\{\beta^*_{I^+}\gamma^*_{I^-}\Phi_\alpha\}$ is a basis of the space of chiral descendants modulo integrals of motion.
- The Wick contraction rule applies with the pairing

$$\omega_{j,k}(\kappa,\alpha) = \frac{\langle 1-\kappa|\beta^*_{2j-1}\gamma^*_{2k-1}\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle}.$$

Conjecture(CFT)

- The following limit exists in the weak sense:

$$\beta^*(\lambda) = \lim \frac{1}{2}\mathbf{b}^*\Big((Ca)^\nu\lambda\Big) \simeq \sum_{j=1}^{\infty} \beta^*_{2j-1}\lambda^{-\frac{2j-1}{\nu}},$$

$$\gamma^*(\lambda) = \lim \frac{1}{2}\mathbf{c}^*\Big((Ca)^\nu\lambda\Big) \simeq \sum_{j=1}^{\infty} \gamma^*_{2j-1}\lambda^{-\frac{2j-1}{\nu}}.$$

- The set $\{\beta^*_{I^+}\gamma^*_{I^-}\Phi_\alpha\}$ is a basis of the space of chiral descendants modulo integrals of motion.
- The Wick contraction rule applies with the pairing

$$\omega_{j,k}(\kappa,\alpha) = \frac{\langle 1-\kappa|\beta^*_{2j-1}\gamma^*_{2k-1}\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle}.$$

Conjecture(CFT)

- The following limit exists in the weak sense:

$$\beta^*(\lambda) = \lim \frac{1}{2}\mathbf{b}^*\Big((Ca)^\nu\lambda\Big) \simeq \sum_{j=1}^{\infty}\beta^*_{2j-1}\lambda^{-\frac{2j-1}{\nu}},$$

$$\gamma^*(\lambda) = \lim \frac{1}{2}\mathbf{c}^*\Big((Ca)^\nu\lambda\Big) \simeq \sum_{j=1}^{\infty}\gamma^*_{2j-1}\lambda^{-\frac{2j-1}{\nu}}.$$

- The set $\{\beta^*_{I^+}\gamma^*_{I^-}\Phi_\alpha\}$ is a basis of the space of chiral descendants modulo integrals of motion.
- The Wick contraction rule applies with the pairing

$$\omega_{j,k}(\kappa,\alpha) = \frac{\langle 1-\kappa|\beta^*_{2j-1}\gamma^*_{2k-1}\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle}.$$

Conjecture(CFT)

- The following limit exists in the weak sense:

$$\beta^*(\lambda) = \lim \frac{1}{2}\mathbf{b}^*\Big((Ca)^\nu \lambda\Big) \simeq \sum_{j=1}^{\infty} \beta^*_{2j-1} \lambda^{-\frac{2j-1}{\nu}},$$

$$\gamma^*(\lambda) = \lim \frac{1}{2}\mathbf{c}^*\Big((Ca)^\nu \lambda\Big) \simeq \sum_{j=1}^{\infty} \gamma^*_{2j-1} \lambda^{-\frac{2j-1}{\nu}}.$$

- The set $\{\beta^*_{I^+}\gamma^*_{I^-}\Phi_\alpha\}$ is a basis of the space of chiral descendants modulo integrals of motion.
- The Wick contraction rule applies with the pairing

$$\omega_{j,k}(\kappa,\alpha) = \frac{\langle 1-\kappa|\beta^*_{2j-1}\gamma^*_{2k-1}\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle}.$$

Example:

Example: The relations

$$\beta_1^*\gamma_1^*\Phi_\alpha = A\cdot\ell_{-2}\Phi_\alpha + B\cdot\ell_{-1}^2\Phi_\alpha\,,$$

$$\frac{\langle 1-\kappa|\beta_1^*\gamma_1^*\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle} = A\cdot\frac{\langle 1-\kappa|\ell_{-2}\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle} + B\cdot 0 \quad (\forall\kappa)$$

Example: The relations

$$\beta_1^*\gamma_1^*\Phi_\alpha = A\cdot \ell_{-2}\Phi_\alpha + B\cdot \ell_{-1}^2\Phi_\alpha\,,$$

$$\frac{\langle 1-\kappa|\beta_1^*\gamma_1^*\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle} = A\cdot\frac{\langle 1-\kappa|\ell_{-2}\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle} + B\cdot 0 \quad (\forall\kappa)$$

Example: The relations

$$\beta_1^*\gamma_1^*\Phi_\alpha = A\cdot \ell_{-2}\Phi_\alpha + B\cdot \ell_{-1}^2\Phi_\alpha\,,$$

$$\frac{\langle 1-\kappa|\beta_1^*\gamma_1^*\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle} = A\cdot\frac{\langle 1-\kappa|\ell_{-2}\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle} + B\cdot 0 \quad (\forall\kappa)$$

Example: The relations

$$\beta_1^*\gamma_1^*\Phi_\alpha = A\cdot\ell_{-2}\Phi_\alpha + B\cdot\ell_{-1}^2\Phi_\alpha\,,$$

$$\frac{\langle 1-\kappa|\beta_1^*\gamma_1^*\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle} = A\cdot\frac{\langle 1-\kappa|\ell_{-2}\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle} + B\cdot 0 \quad (\forall\kappa)$$

Example: The relations

$$\beta_1^*\gamma_1^*\Phi_\alpha = A\cdot \ell_{-2}\Phi_\alpha + B\cdot \ell_{-1}^2\Phi_\alpha\,,$$

$$\frac{\langle 1-\kappa|\beta_1^*\gamma_1^*\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle} = A\cdot \frac{\langle 1-\kappa|\ell_{-2}\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle} + B\cdot 0 \quad (\forall\kappa)$$

Example: The relations

$$\beta_1^*\gamma_1^*\Phi_\alpha = A\cdot\ell_{-2}\Phi_\alpha + B\cdot\ell_{-1}^2\Phi_\alpha\,.$$

$$\frac{\langle 1-\kappa|\beta_1^*\gamma_1^*\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle} = A\cdot\frac{\langle 1-\kappa|\ell_{-2}\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle} + B\cdot 0 \quad (\forall\kappa)$$

Example: The relations

$$\beta_1^*\gamma_1^*\Phi_\alpha = A\cdot\ell_{-2}\Phi_\alpha + B\cdot\ell_{-1}^2\Phi_\alpha\,.$$

$$\frac{\langle 1-\kappa|\beta_1^*\gamma_1^*\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle} = A\cdot\frac{\langle 1-\kappa|\ell_{-2}\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle} + B\cdot 0 \quad (\forall\kappa)$$

Example: The relations

$$\beta_1^* \gamma_1^* \Phi_\alpha = A \cdot \ell_{-2} \Phi_\alpha + B \cdot \ell_{-1}^2 \Phi_\alpha ,$$

$$\frac{\langle 1-\kappa | \beta_1^* \gamma_1^* \Phi_\alpha | 1+\kappa \rangle}{\langle 1-\kappa | \Phi_\alpha | 1+\kappa \rangle} = A \cdot \frac{\langle 1-\kappa | \ell_{-2} \Phi_\alpha | 1+\kappa \rangle}{\langle 1-\kappa | \Phi_\alpha | 1+\kappa \rangle} + B \cdot 0 \quad (\forall \kappa)$$

Example: The relations

$$\beta_1^*\gamma_1^*\Phi_\alpha = A \cdot \ell_{-2}\Phi_\alpha + B \cdot \ell_{-1}^2\Phi_\alpha ,$$

$$\frac{\langle 1-\kappa|\beta_1^*\gamma_1^*\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle} = A \cdot \frac{\langle 1-\kappa|\ell_{-2}\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle} + B \cdot 0 \quad (\forall\kappa)$$

Example: The relations

$$\beta_1^*\gamma_1^*\Phi_\alpha = A\cdot \ell_{-2}\Phi_\alpha + B\cdot \ell_{-1}^2\Phi_\alpha\,.$$

$$\frac{\langle 1-\kappa|\beta_1^*\gamma_1^*\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle} = A\cdot \frac{\langle 1-\kappa|\ell_{-2}\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle} + B\cdot 0 \quad (\forall\kappa)$$

Example: The relations

$$\beta_1^* \gamma_1^* \Phi_\alpha = A \cdot \ell_{-2} \Phi_\alpha + B \cdot \ell_{-1}^2 \Phi_\alpha \,,$$

$$\frac{\langle 1-\kappa | \beta_1^* \gamma_1^* \Phi_\alpha | 1+\kappa \rangle}{\langle 1-\kappa | \Phi_\alpha | 1+\kappa \rangle} = A \cdot \frac{\langle 1-\kappa | \ell_{-2} \Phi_\alpha | 1+\kappa \rangle}{\langle 1-\kappa | \Phi_\alpha | 1+\kappa \rangle} + B \cdot 0 \quad (\forall \kappa)$$

Example: The relations

$$\beta_1^*\gamma_1^*\Phi_\alpha = A\cdot\ell_{-2}\Phi_\alpha + B\cdot\ell_{-1}^2\Phi_\alpha\,,$$

$$\frac{\langle 1-\kappa|\beta_1^*\gamma_1^*\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle} = A\cdot\frac{\langle 1-\kappa|\ell_{-2}\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle} + B\cdot 0 \quad (\forall\kappa)$$

Example: The relations

$$\beta_1^* \gamma_1^* \Phi_\alpha = A \cdot \ell_{-2} \Phi_\alpha + B \cdot \ell_{-1}^2 \Phi_\alpha \,,$$

$$\frac{\langle 1-\kappa | \beta_1^* \gamma_1^* \Phi_\alpha | 1+\kappa \rangle}{\langle 1-\kappa | \Phi_\alpha | 1+\kappa \rangle} = A \cdot \frac{\langle 1-\kappa | \ell_{-2} \Phi_\alpha | 1+\kappa \rangle}{\langle 1-\kappa | \Phi_\alpha | 1+\kappa \rangle} + B \cdot 0 \quad (\forall \kappa)$$

Example: The relations

$$\beta_1^*\gamma_1^*\Phi_\alpha = A\cdot\ell_{-2}\Phi_\alpha + B\cdot\ell_{-1}^2\Phi_\alpha\,,$$

$$\frac{\langle 1-\kappa|\beta_1^*\gamma_1^*\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle} = A\cdot\frac{\langle 1-\kappa|\ell_{-2}\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle} + B\cdot 0 \quad (\forall\kappa)$$

Example: The relations

$$\beta_1^*\gamma_1^*\Phi_\alpha = A\cdot \ell_{-2}\Phi_\alpha + B\cdot \ell_{-1}^2\Phi_\alpha\,,$$

$$\frac{\langle 1-\kappa|\beta_1^*\gamma_1^*\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle} = A\cdot\frac{\langle 1-\kappa|\ell_{-2}\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle} + B\cdot 0 \quad (\forall\kappa)$$

imply

$$A = D_1(\alpha)D_1(2-\alpha)\,,$$

$$D_a(\alpha) = \frac{1}{\sqrt{i\nu}}\Big(\Gamma(\nu)^{-1/\nu}\sqrt{1-\nu}\Big)^a\frac{\Gamma\left(\frac{\alpha}{2}+\frac{a}{2\nu}\right)}{\Gamma\left(\frac{a+1}{2}\right)\Gamma\left(\frac{\alpha}{2}+\frac{1-\nu}{2\nu}a\right)}\,.$$

Example: The relations

$$\beta_1^*\gamma_1^*\Phi_\alpha = A\cdot \ell_{-2}\Phi_\alpha + B\cdot \ell_{-1}^2\Phi_\alpha\,,$$

$$\frac{\langle 1-\kappa|\beta_1^*\gamma_1^*\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle} = A\cdot\frac{\langle 1-\kappa|\ell_{-2}\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle} + B\cdot 0 \quad (\forall\kappa)$$

imply

$$A = D_1(\alpha)D_1(2-\alpha)\,,$$

$$D_a(\alpha) = \frac{1}{\sqrt{i\nu}}\Big(\Gamma(\nu)^{-1/\nu}\sqrt{1-\nu}\Big)^a\frac{\Gamma\Big(\frac{\alpha}{2}+\frac{a}{2\nu}\Big)}{\Gamma\Big(\frac{a+1}{2}\Big)\Gamma\Big(\frac{\alpha}{2}+\frac{1-\nu}{2\nu}a\Big)}\,.$$

Example: The relations

$$\beta_1^*\gamma_1^*\Phi_\alpha = A\cdot\ell_{-2}\Phi_\alpha + B\cdot\ell_{-1}^2\Phi_\alpha\,,$$
$$\frac{\langle 1-\kappa|\beta_1^*\gamma_1^*\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle} = A\cdot\frac{\langle 1-\kappa|\ell_{-2}\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle} + B\cdot 0 \quad (\forall\kappa)$$

imply

$$A = D_1(\alpha)D_1(2-\alpha)\,,$$
$$D_a(\alpha) = \frac{1}{\sqrt{i\nu}}\Big(\Gamma(\nu)^{-1/\nu}\sqrt{1-\nu}\Big)^a\frac{\Gamma\Big(\frac{\alpha}{2}+\frac{a}{2\nu}\Big)}{\Gamma\Big(\frac{a+1}{2}\Big)\Gamma\Big(\frac{\alpha}{2}+\frac{1-\nu}{2\nu}a\Big)}\,.$$

Example: The relations

$$\beta_1^*\gamma_1^*\Phi_\alpha = A\cdot \ell_{-2}\Phi_\alpha + B\cdot \ell_{-1}^2\Phi_\alpha\,,$$

$$\frac{\langle 1-\kappa|\beta_1^*\gamma_1^*\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle} = A\cdot \frac{\langle 1-\kappa|\ell_{-2}\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle} + B\cdot 0 \quad (\forall\kappa)$$

imply

$$A = D_1(\alpha)D_1(2-\alpha)\,,$$

$$D_a(\alpha) = \frac{1}{\sqrt{i\nu}}\Big(\Gamma(\nu)^{-1/\nu}\sqrt{1-\nu}\Big)^a \frac{\Gamma\Big(\frac{\alpha}{2}+\frac{a}{2\nu}\Big)}{\Gamma\Big(\frac{a+1}{2}\Big)\Gamma\Big(\frac{\alpha}{2}+\frac{1-\nu}{2\nu}a\Big)}\,.$$

Example: The relations

$$\beta_1^*\gamma_1^*\Phi_\alpha = A\cdot \ell_{-2}\Phi_\alpha + B\cdot \ell_{-1}^2\Phi_\alpha\,,$$

$$\frac{\langle 1-\kappa|\beta_1^*\gamma_1^*\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle} = A\cdot\frac{\langle 1-\kappa|\ell_{-2}\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle} + B\cdot 0 \quad (\forall\kappa)$$

imply

$$A = D_1(\alpha)D_1(2-\alpha)\,,$$

$$D_a(\alpha) = \frac{1}{\sqrt{i\nu}}\Big(\Gamma(\nu)^{-1/\nu}\sqrt{1-\nu}\Big)^a \frac{\Gamma\Big(\frac{\alpha}{2}+\frac{a}{2\nu}\Big)}{\Gamma\Big(\frac{a+1}{2}\Big)\Gamma\Big(\frac{\alpha}{2}+\frac{1-\nu}{2\nu}a\Big)}\,.$$

Example: The relations

$$\beta_1^*\gamma_1^*\Phi_\alpha = A\cdot \ell_{-2}\Phi_\alpha + B\cdot \ell_{-1}^2\Phi_\alpha\,,$$

$$\frac{\langle 1-\kappa|\beta_1^*\gamma_1^*\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle} = A\cdot\frac{\langle 1-\kappa|\ell_{-2}\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle} + B\cdot 0 \quad (\forall\kappa)$$

imply

$$A = D_1(\alpha)D_1(2-\alpha)\,,$$

$$D_a(\alpha) = \frac{1}{\sqrt{i\nu}}\Big(\Gamma(\nu)^{-1/\nu}\sqrt{1-\nu}\Big)^a\frac{\Gamma\left(\frac{\alpha}{2}+\frac{a}{2\nu}\right)}{\Gamma\left(\frac{a+1}{2}\right)\Gamma\left(\frac{\alpha}{2}+\frac{1-\nu}{2\nu}a\right)}\,.$$

Example: The relations

$$\beta_1^*\gamma_1^*\Phi_\alpha = A\cdot \ell_{-2}\Phi_\alpha + B\cdot \ell_{-1}^2\Phi_\alpha\,,$$
$$\frac{\langle 1-\kappa|\beta_1^*\gamma_1^*\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle} = A\cdot\frac{\langle 1-\kappa|\ell_{-2}\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle} + B\cdot 0 \quad (\forall\kappa)$$

imply

$$A = D_1(\alpha)D_1(2-\alpha)\,,$$
$$D_a(\alpha) = \frac{1}{\sqrt{i\nu}}\Big(\Gamma(\nu)^{-1/\nu}\sqrt{1-\nu}\Big)^a\frac{\Gamma\Big(\frac{\alpha}{2}+\frac{a}{2\nu}\Big)}{\Gamma\Big(\frac{a+1}{2}\Big)\Gamma\Big(\frac{\alpha}{2}+\frac{1-\nu}{2\nu}a\Big)}\,.$$

Similar (overdetermined) equations have been consistently solved upto degree 8.

Example: The relations

$$\beta_1^*\gamma_1^*\Phi_\alpha = A\cdot \ell_{-2}\Phi_\alpha + B\cdot \ell_{-1}^2\Phi_\alpha ,$$

$$\frac{\langle 1-\kappa|\beta_1^*\gamma_1^*\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle} = A\cdot \frac{\langle 1-\kappa|\ell_{-2}\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle} + B\cdot 0 \quad (\forall\kappa)$$

imply

$$A = D_1(\alpha)D_1(2-\alpha)\,,$$

$$D_a(\alpha) = \frac{1}{\sqrt{i\nu}}\Big(\Gamma(\nu)^{-1/\nu}\sqrt{1-\nu}\Big)^a \frac{\Gamma\Big(\frac{\alpha}{2}+\frac{a}{2\nu}\Big)}{\Gamma\Big(\frac{a+1}{2}\Big)\Gamma\Big(\frac{\alpha}{2}+\frac{1-\nu}{2\nu}a\Big)}\,.$$

Similar (overdetermined) equations have been consistently solved upto degree 8.

Example: The relations

$$\beta_1^*\gamma_1^*\Phi_\alpha = A\cdot\ell_{-2}\Phi_\alpha + B\cdot\ell_{-1}^2\Phi_\alpha\,,$$

$$\frac{\langle 1-\kappa|\beta_1^*\gamma_1^*\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle} = A\cdot\frac{\langle 1-\kappa|\ell_{-2}\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle} + B\cdot 0 \quad (\forall\kappa)$$

imply

$$A = D_1(\alpha)D_1(2-\alpha)\,,$$

$$D_a(\alpha) = \frac{1}{\sqrt{i\nu}}\Big(\Gamma(\nu)^{-1/\nu}\sqrt{1-\nu}\Big)^a\frac{\Gamma\Big(\frac{\alpha}{2}+\frac{a}{2\nu}\Big)}{\Gamma\Big(\frac{a+1}{2}\Big)\Gamma\Big(\frac{\alpha}{2}+\frac{1-\nu}{2\nu}a\Big)}\,.$$

Similar (overdetermined) equations have been consistently solved upto degree 8.

Example: The relations

$$\beta_1^*\gamma_1^*\Phi_\alpha = A\cdot \ell_{-2}\Phi_\alpha + B\cdot \ell_{-1}^2\Phi_\alpha\,.$$

$$\frac{\langle 1-\kappa|\beta_1^*\gamma_1^*\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle} = A\cdot \frac{\langle 1-\kappa|\ell_{-2}\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle} + B\cdot 0 \quad (\forall\kappa)$$

imply

$$A = D_1(\alpha)D_1(2-\alpha)\,,$$

$$D_a(\alpha) = \frac{1}{\sqrt{i\nu}}\Big(\Gamma(\nu)^{-1/\nu}\sqrt{1-\nu}\Big)^a \frac{\Gamma\left(\frac{\alpha}{2}+\frac{a}{2\nu}\right)}{\Gamma\left(\frac{a+1}{2}\right)\Gamma\left(\frac{\alpha}{2}+\frac{1-\nu}{2\nu}a\right)}\,.$$

Similar (overdetermined) equations have been consistently solved upto degree 8.

Example: The relations

$$\beta_1^*\gamma_1^*\Phi_\alpha = A\cdot \ell_{-2}\Phi_\alpha + B\cdot \ell_{-1}^2\Phi_\alpha\,,$$

$$\frac{\langle 1-\kappa|\beta_1^*\gamma_1^*\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle} = A\cdot\frac{\langle 1-\kappa|\ell_{-2}\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle} + B\cdot 0 \quad (\forall\kappa)$$

imply

$$A = D_1(\alpha)D_1(2-\alpha)\,,$$

$$D_a(\alpha) = \frac{1}{\sqrt{i\nu}}\left(\Gamma(\nu)^{-1/\nu}\sqrt{1-\nu}\right)^a \frac{\Gamma\left(\frac{\alpha}{2}+\frac{a}{2\nu}\right)}{\Gamma\left(\frac{a+1}{2}\right)\Gamma\left(\frac{\alpha}{2}+\frac{1-\nu}{2\nu}a\right)}\,.$$

Similar (overdetermined) equations have been consistently solved upto degree 8.

Example: The relations

$$\beta_1^*\gamma_1^*\Phi_\alpha = A\cdot\ell_{-2}\Phi_\alpha + B\cdot\ell_{-1}^2\Phi_\alpha\,,$$

$$\frac{\langle 1-\kappa|\beta_1^*\gamma_1^*\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle} = A\cdot\frac{\langle 1-\kappa|\ell_{-2}\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle} + B\cdot 0 \quad (\forall\kappa)$$

imply

$$A = D_1(\alpha)D_1(2-\alpha)\,,$$

$$D_a(\alpha) = \frac{1}{\sqrt{i\nu}}\Big(\Gamma(\nu)^{-1/\nu}\sqrt{1-\nu}\Big)^a\frac{\Gamma\left(\frac{\alpha}{2}+\frac{a}{2\nu}\right)}{\Gamma\left(\frac{a+1}{2}\right)\Gamma\left(\frac{\alpha}{2}+\frac{1-\nu}{2\nu}a\right)}\,.$$

Similar (overdetermined) equations have been consistently solved upto degree 8.

Example: The relations

$$\beta_1^*\gamma_1^*\Phi_\alpha = A\cdot\ell_{-2}\Phi_\alpha + B\cdot\ell_{-1}^2\Phi_\alpha\,,$$

$$\frac{\langle 1-\kappa|\beta_1^*\gamma_1^*\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle} = A\cdot\frac{\langle 1-\kappa|\ell_{-2}\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle} + B\cdot 0 \quad (\forall\kappa)$$

imply

$$A = D_1(\alpha)D_1(2-\alpha)\,,$$

$$D_a(\alpha) = \frac{1}{\sqrt{i\nu}}\Big(\Gamma(\nu)^{-1/\nu}\sqrt{1-\nu}\Big)^a\frac{\Gamma\Big(\frac{\alpha}{2}+\frac{a}{2\nu}\Big)}{\Gamma\Big(\frac{a+1}{2}\Big)\Gamma\Big(\frac{\alpha}{2}+\frac{1-\nu}{2\nu}a\Big)}\,.$$

Similar (overdetermined) equations have been consistently solved upto degree 8.

Example: The relations

$$\beta_1^*\gamma_1^*\Phi_\alpha = A\cdot \ell_{-2}\Phi_\alpha + B\cdot \ell_{-1}^2\Phi_\alpha\,,$$

$$\frac{\langle 1-\kappa|\beta_1^*\gamma_1^*\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle} = A\cdot \frac{\langle 1-\kappa|\ell_{-2}\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle} + B\cdot 0 \quad (\forall\kappa)$$

imply

$$A = D_1(\alpha)D_1(2-\alpha)\,,$$

$$D_a(\alpha) = \frac{1}{\sqrt{i\nu}}\Big(\Gamma(\nu)^{-1/\nu}\sqrt{1-\nu}\Big)^a \frac{\Gamma\Big(\frac{\alpha}{2}+\frac{a}{2\nu}\Big)}{\Gamma\Big(\frac{a+1}{2}\Big)\Gamma\Big(\frac{\alpha}{2}+\frac{1-\nu}{2\nu}a\Big)}\,.$$

Similar (overdetermined) equations have been consistently solved upto degree 8.

Example: The relations

$$\beta_1^*\gamma_1^*\Phi_\alpha = A\cdot\ell_{-2}\Phi_\alpha + B\cdot\ell_{-1}^2\Phi_\alpha\,,$$

$$\frac{\langle 1-\kappa|\beta_1^*\gamma_1^*\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle} = A\cdot\frac{\langle 1-\kappa|\ell_{-2}\Phi_\alpha|1+\kappa\rangle}{\langle 1-\kappa|\Phi_\alpha|1+\kappa\rangle} + B\cdot 0 \quad (\forall\kappa)$$

imply

$$A = D_1(\alpha)D_1(2-\alpha)\,,$$

$$D_a(\alpha) = \frac{1}{\sqrt{i\nu}}\Big(\Gamma(\nu)^{-1/\nu}\sqrt{1-\nu}\Big)^a\frac{\Gamma\left(\frac{\alpha}{2}+\frac{a}{2\nu}\right)}{\Gamma\left(\frac{a+1}{2}\right)\Gamma\left(\frac{\alpha}{2}+\frac{1-\nu}{2\nu}a\right)}\,.$$

Similar (overdetermined) equations have been consistently solved upto degree 8.

Conjecture(screening operators)

Example:

For the function $\omega_{\mathbf{n}}(\zeta,\xi)$:

$$\omega^{\mathrm{sc}}(\lambda,\mu)=\lim\frac{1}{4}\omega_{\mathbf{n}}\Big((Ca)^{\nu}\lambda,(Ca)^{\nu}\mu\Big)$$

has the asymptotics of the form

$$\omega^{\mathrm{sc}}(\lambda,\mu)\simeq\sum_{j,k=1}^{\infty}\omega_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\frac{2k-1}{\nu}}\quad(\lambda^2,\mu^2\to\infty),$$

$$\simeq\sum_{j,k=1}^{\infty}\tilde{\omega}_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\alpha+2k}\quad(\lambda^2\to\infty,\mu^2\to 0).$$

We postulate that the coefficients in these expansions are some three point functions in CFT.

For the function $\omega_{\mathbf{n}}(\zeta,\xi)$:

$$\omega^{\mathrm{sc}}(\lambda,\mu)=\lim\frac{1}{4}\omega_{\mathbf{n}}\Big((Ca)^{\nu}\lambda,(Ca)^{\nu}\mu\Big)$$

has the asymptotics of the form

$$\omega^{\mathrm{sc}}(\lambda,\mu)\simeq\sum_{j,k=1}^{\infty}\omega_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\frac{2k-1}{\nu}}\quad(\lambda^2,\mu^2\to\infty)\,,$$

$$\simeq\sum_{j,k=1}^{\infty}\tilde{\omega}_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\alpha+2k}\quad(\lambda^2\to\infty,\mu^2\to 0)\,.$$

We postulate that the coefficients in these expansions are some three point functions in CFT.

For the function $\omega_{\mathbf{n}}(\zeta,\xi)$:

$$\omega^{\mathrm{sc}}(\lambda,\mu)=\lim\frac{1}{4}\omega_{\mathbf{n}}\Big((Ca)^{\nu}\lambda,(Ca)^{\nu}\mu\Big)$$

has the asymptotics of the form

$$\omega^{\mathrm{sc}}(\lambda,\mu)\simeq\sum_{j,k=1}^{\infty}\omega_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\frac{2k-1}{\nu}}\quad(\lambda^2,\mu^2\to\infty),$$

$$\simeq\sum_{j,k=1}^{\infty}\tilde{\omega}_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\alpha+2k}\quad(\lambda^2\to\infty,\mu^2\to 0).$$

We postulate that the coefficients in these expansions are some three point functions in CFT.

For the function $\omega_{\mathbf{n}}(\zeta,\xi)$:

$$\omega^{\mathrm{sc}}(\lambda,\mu)=\lim\frac{1}{4}\omega_{\mathbf{n}}\Big((Ca)^{\nu}\lambda,(Ca)^{\nu}\mu\Big)$$

has the asymptotics of the form

$$\omega^{\mathrm{sc}}(\lambda,\mu)\simeq\sum_{j,k=1}^{\infty}\omega_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\frac{2k-1}{\nu}}\quad(\lambda^2,\mu^2\to\infty)\,,$$

$$\simeq\sum_{j,k=1}^{\infty}\tilde{\omega}_{j,k}(\kappa,\alpha)\,\lambda^{-\frac{2j-1}{\nu}}\mu^{-\alpha+2k}\quad(\lambda^2\to\infty,\mu^2\to 0)\,.$$

We postulate that the coefficients in these expansions are some three point functions in CFT.

Example:

Conjecture(screening operators)

The coefficients $\tilde{\omega}_{j,k}(\kappa,\alpha)$ are used to define the Wick pairing between β^*_{2j-1} and a new fermion $\gamma^*_{\mathrm{screen},k}$.

$$\beta^*_{I^+}\gamma^*_{I^-}\Phi_{\alpha+2\frac{1-\nu}{\nu}} \simeq \tilde{C}_{1,0}(\alpha)\cdot\beta^*_{I^++2}\gamma^*_{I^--2}\beta^*_1\gamma^*_{\mathrm{screen},1}\Phi_{\alpha}\,.$$

where

$$\tilde{C}_{1,0}(\alpha) = -\Gamma(\nu)^{2\alpha+2\frac{1-\nu}{\nu}}\frac{1}{2\nu}$$
$$\times\gamma\left(\frac{1}{2}-\frac{\alpha}{2}-\frac{1-\nu}{2\nu}\right)\gamma\left(\frac{\alpha}{2}+\frac{1-\nu}{2\nu}\right)\gamma\left(\nu-\nu\alpha\right),$$
$$\gamma(x)=\Gamma(x)/\Gamma(1-x).$$

Conjecture(screening operators)

The coefficients $\tilde{\omega}_{j,k}(\kappa,\alpha)$ are used to define the Wick pairing between β^*_{2j-1} and a new fermion $\gamma^*_{\mathrm{screen},k}$.

$$\beta^*_{I^+}\gamma^*_{I^-}\Phi_{\alpha+2\frac{1-\nu}{\nu}} \simeq \tilde{C}_{1,0}(\alpha)\cdot\beta^*_{I^++2}\gamma^*_{I^--2}\beta^*_1\gamma^*_{\mathrm{screen},1}\Phi_\alpha\,.$$

where

$$\tilde{C}_{1,0}(\alpha) = -\Gamma(\nu)^{2\alpha+2\frac{1-\nu}{\nu}}\frac{1}{2\nu}$$
$$\times\gamma\left(\frac{1}{2}-\frac{\alpha}{2}-\frac{1-\nu}{2\nu}\right)\gamma\left(\frac{\alpha}{2}+\frac{1-\nu}{2\nu}\right)\gamma\left(\nu-\nu\alpha\right),$$
$$\gamma(x)=\Gamma(x)/\Gamma(1-x).$$

Conjecture(screening operators)

The coefficients $\tilde{\omega}_{j,k}(\kappa,\alpha)$ are used to define the Wick pairing between β^*_{2j-1} and a new fermion $\gamma^*_{\mathrm{screen},k}$.

$$\beta^*_{I^+}\gamma^*_{I^-}\Phi_{\alpha+2\frac{1-\nu}{\nu}} \simeq \tilde{C}_{1,0}(\alpha)\cdot\beta^*_{I^++2}\gamma^*_{I^--2}\beta^*_1\gamma^*_{\mathrm{screen},1}\Phi_\alpha\,.$$

where

$$\tilde{C}_{1,0}(\alpha) = -\Gamma(\nu)^{2\alpha+2\frac{1-\nu}{\nu}}\frac{1}{2\nu}$$
$$\times\,\gamma\left(\frac{1}{2}-\frac{\alpha}{2}-\frac{1-\nu}{2\nu}\right)\gamma\left(\frac{\alpha}{2}+\frac{1-\nu}{2\nu}\right)\gamma\left(\nu-\nu\alpha\right),$$
$$\gamma(x)=\Gamma(x)/\Gamma(1-x).$$

Conjecture(screening operators)

The coefficients $\tilde{\omega}_{j,k}(\kappa,\alpha)$ are used to define the Wick pairing between β^*_{2j-1} and a new fermion $\gamma^*_{\mathrm{screen},k}$.

$$\beta^*_{I^+}\gamma^*_{I^-}\Phi_{\alpha+2\frac{1-\nu}{\nu}} \simeq \tilde{C}_{1,0}(\alpha)\cdot\beta^*_{I^+ +2}\gamma^*_{I^- -2}\beta^*_1\gamma^*_{\mathrm{screen},1}\Phi_\alpha\,.$$

where

$$\tilde{C}_{1,0}(\alpha) = -\Gamma(\nu)^{2\alpha+2\frac{1-\nu}{\nu}}\frac{1}{2\nu}$$
$$\times\,\gamma\left(\frac{1}{2}-\frac{\alpha}{2}-\frac{1-\nu}{2\nu}\right)\gamma\left(\frac{\alpha}{2}+\frac{1-\nu}{2\nu}\right)\gamma\left(\nu-\nu\alpha\right),$$
$$\gamma(x) = \Gamma(x)/\Gamma(1-x).$$

Conjecture(screening operators)

The coefficients $\tilde{\omega}_{j,k}(\kappa,\alpha)$ are used to define the Wick pairing between β^*_{2j-1} and a new fermion $\gamma^*_{\text{screen},k}$.

$$\beta^*_{I^+}\gamma^*_{I^-}\Phi_{\alpha+2\frac{1-\nu}{\nu}} \simeq \tilde{C}_{1,0}(\alpha)\cdot\beta^*_{I^++2}\gamma^*_{I^--2}\beta^*_1\gamma^*_{\text{screen},1}\Phi_\alpha\,.$$

where

$$\tilde{C}_{1,0}(\alpha) = -\Gamma(\nu)^{2\alpha+2\frac{1-\nu}{\nu}}\frac{1}{2\nu}$$
$$\times\,\gamma\left(\frac{1}{2}-\frac{\alpha}{2}-\frac{1-\nu}{2\nu}\right)\gamma\left(\frac{\alpha}{2}+\frac{1-\nu}{2\nu}\right)\gamma\left(\nu-\nu\alpha\right),$$
$$\gamma(x)=\Gamma(x)/\Gamma(1-x).$$

Conjecture(screening operators)

The coefficients $\tilde{\omega}_{j,k}(\kappa,\alpha)$ are used to define the Wick pairing between β^*_{2j-1} and a new fermion $\gamma^*_{\mathrm{screen},k}$.

$$\beta^*_{I^+}\gamma^*_{I^-}\Phi_{\alpha+2\frac{1-\nu}{\nu}} \simeq \tilde{C}_{1,0}(\alpha)\cdot\beta^*_{I^++2}\gamma^*_{I^--2}\beta^*_1\gamma^*_{\mathrm{screen},1}\Phi_\alpha\,.$$

where

$$\tilde{C}_{1,0}(\alpha) = -\Gamma(\nu)^{2\alpha+2\frac{1-\nu}{\nu}}\frac{1}{2\nu}$$
$$\times\gamma\left(\frac{1}{2}-\frac{\alpha}{2}-\frac{1-\nu}{2\nu}\right)\gamma\left(\frac{\alpha}{2}+\frac{1-\nu}{2\nu}\right)\gamma\left(\nu-\nu\alpha\right),$$
$$\gamma(x)=\Gamma(x)/\Gamma(1-x).$$

Conjecture(screening operators)

The coefficients $\tilde{\omega}_{j,k}(\kappa,\alpha)$ are used to define the Wick pairing between β^*_{2j-1} and a new fermion $\gamma^*_{\mathrm{screen},k}$.

$$\beta^*_{I^+}\gamma^*_{I^-}\Phi_{\alpha+2\frac{1-\nu}{\nu}} \simeq \tilde{C}_{1,0}(\alpha)\cdot\beta^*_{I^++2}\gamma^*_{I^--2}\beta^*_1\gamma^*_{\mathrm{screen},1}\Phi_\alpha\,.$$

where

$$\tilde{C}_{1,0}(\alpha) = -\Gamma(\nu)^{2\alpha+2\frac{1-\nu}{\nu}}\frac{1}{2\nu}$$
$$\times\gamma\left(\frac{1}{2}-\frac{\alpha}{2}-\frac{1-\nu}{2\nu}\right)\gamma\left(\frac{\alpha}{2}+\frac{1-\nu}{2\nu}\right)\gamma\left(\nu-\nu\alpha\right),$$
$$\gamma(x)=\Gamma(x)/\Gamma(1-x).$$

Conjecture(screening operators)

The coefficients $\tilde{\omega}_{j,k}(\kappa,\alpha)$ are used to define the Wick pairing between β^*_{2j-1} and a new fermion $\gamma^*_{\mathrm{screen},k}$.

$$\beta^*_{I^+}\gamma^*_{I^-}\Phi_{\alpha+2\frac{1-\nu}{\nu}} \simeq \tilde{C}_{1,0}(\alpha)\cdot\beta^*_{I^++2}\gamma^*_{I^--2}\beta^*_1\gamma^*_{\mathrm{screen},1}\Phi_\alpha\,.$$

where

$$\tilde{C}_{1,0}(\alpha) = -\Gamma(\nu)^{2\alpha+2\frac{1-\nu}{\nu}}\frac{1}{2\nu}$$
$$\times\gamma\left(\frac{1}{2}-\frac{\alpha}{2}-\frac{1-\nu}{2\nu}\right)\gamma\left(\frac{\alpha}{2}+\frac{1-\nu}{2\nu}\right)\gamma\left(\nu-\nu\alpha\right),$$
$$\gamma(x) = \Gamma(x)/\Gamma(1-x).$$

Conjecture(screening operators)

The coefficients $\tilde{\omega}_{j,k}(\kappa,\alpha)$ are used to define the Wick pairing between β^*_{2j-1} and a new fermion $\gamma^*_{\mathrm{screen},k}$.

$$\beta^*_{I^+}\gamma^*_{I^-}\Phi_{\alpha+2\frac{1-\nu}{\nu}} \simeq \tilde{C}_{1,0}(\alpha)\cdot\beta^*_{I^++2}\gamma^*_{I^--2}\beta^*_1\gamma^*_{\mathrm{screen},1}\Phi_\alpha\,.$$

where

$$\tilde{C}_{1,0}(\alpha) = -\Gamma(\nu)^{2\alpha+2\frac{1-\nu}{\nu}}\frac{1}{2\nu}$$
$$\times\gamma\left(\frac{1}{2}-\frac{\alpha}{2}-\frac{1-\nu}{2\nu}\right)\gamma\left(\frac{\alpha}{2}+\frac{1-\nu}{2\nu}\right)\gamma\left(\nu-\nu\alpha\right),$$
$$\gamma(x)=\Gamma(x)/\Gamma(1-x).$$

Conjecture(screening operators)

The coefficients $\tilde{\omega}_{j,k}(\kappa,\alpha)$ are used to define the Wick pairing between β^*_{2j-1} and a new fermion $\gamma^*_{\mathrm{screen},k}$.

$$\beta^*_{I^+}\gamma^*_{I^-}\Phi_{\alpha+2\frac{1-\nu}{\nu}} \simeq \tilde{C}_{1,0}(\alpha)\cdot\beta^*_{I^++2}\gamma^*_{I^--2}\beta^*_1\gamma^*_{\mathrm{screen},1}\Phi_\alpha .$$

where

$$\tilde{C}_{1,0}(\alpha) = -\Gamma(\nu)^{2\alpha+2\frac{1-\nu}{\nu}}\frac{1}{2\nu}$$
$$\times\gamma\left(\frac{1}{2}-\frac{\alpha}{2}-\frac{1-\nu}{2\nu}\right)\gamma\left(\frac{\alpha}{2}+\frac{1-\nu}{2\nu}\right)\gamma\left(\nu-\nu\alpha\right),$$
$$\gamma(x) = \Gamma(x)/\Gamma(1-x).$$

Conjecture(screening operators)

The coefficients $\tilde{\omega}_{j,k}(\kappa,\alpha)$ are used to define the Wick pairing between β^*_{2j-1} and a new fermion $\gamma^*_{\mathrm{screen},k}$.

$$\beta^*_{I^+}\gamma^*_{I^-}\Phi_{\alpha+2\frac{1-\nu}{\nu}} \simeq \tilde{C}_{1,0}(\alpha)\cdot\beta^*_{I^++2}\gamma^*_{I^--2}\beta^*_1\gamma^*_{\mathrm{screen},1}\Phi_\alpha \,.$$

where

$$\tilde{C}_{1,0}(\alpha) = -\Gamma(\nu)^{2\alpha+2\frac{1-\nu}{\nu}}\frac{1}{2\nu}$$
$$\times\gamma\left(\frac{1}{2}-\frac{\alpha}{2}-\frac{1-\nu}{2\nu}\right)\gamma\left(\frac{\alpha}{2}+\frac{1-\nu}{2\nu}\right)\gamma\left(\nu-\nu\alpha\right),$$
$$\gamma(x) = \Gamma(x)/\Gamma(1-x).$$

Conjecture(screening operators)

The coefficients $\tilde{\omega}_{j,k}(\kappa,\alpha)$ are used to define the Wick pairing between β^*_{2j-1} and a new fermion $\gamma^*_{\text{screen},k}$.

$$\beta^*_{I^+}\gamma^*_{I^-}\Phi_{\alpha+2\frac{1-\nu}{\nu}} \simeq \tilde{C}_{1,0}(\alpha)\cdot\beta^*_{I^++2}\gamma^*_{I^--2}\beta^*_1\gamma^*_{\text{screen},1}\Phi_\alpha\,.$$

where

$$\tilde{C}_{1,0}(\alpha) = -\Gamma(\nu)^{2\alpha+2\frac{1-\nu}{\nu}}\frac{1}{2\nu}$$
$$\times\gamma\left(\frac{1}{2}-\frac{\alpha}{2}-\frac{1-\nu}{2\nu}\right)\gamma\left(\frac{\alpha}{2}+\frac{1-\nu}{2\nu}\right)\gamma\left(\nu-\nu\alpha\right),$$
$$\gamma(x)=\Gamma(x)/\Gamma(1-x).$$

Conjecture(screening operators)

The coefficients $\tilde{\omega}_{j,k}(\kappa,\alpha)$ are used to define the Wick pairing between β^*_{2j-1} and a new fermion $\gamma^*_{\text{screen},k}$.

$$\beta^*_{I^+}\gamma^*_{I^-}\Phi_{\alpha+2\frac{1-\nu}{\nu}} \simeq \tilde{C}_{1,0}(\alpha)\cdot\beta^*_{I^++2}\gamma^*_{I^--2}\beta^*_1\gamma^*_{\text{screen},1}\Phi_{\alpha}\,.$$

where

$$\tilde{C}_{1,0}(\alpha) = -\Gamma(\nu)^{2\alpha+2\frac{1-\nu}{\nu}}\frac{1}{2\nu}$$
$$\times\gamma\left(\frac{1}{2}-\frac{\alpha}{2}-\frac{1-\nu}{2\nu}\right)\gamma\left(\frac{\alpha}{2}+\frac{1-\nu}{2\nu}\right)\gamma\left(\nu-\nu\alpha\right),$$
$$\gamma(x) = \Gamma(x)/\Gamma(1-x).$$

Conjecture(screening operators)

The coefficients $\tilde{\omega}_{j,k}(\kappa,\alpha)$ are used to define the Wick pairing between β^*_{2j-1} and a new fermion $\gamma^*_{\mathrm{screen},k}$.

$$\beta^*_{I^+}\gamma^*_{I^-}\Phi_{\alpha+2\frac{1-\nu}{\nu}} \simeq \tilde{C}_{1,0}(\alpha)\cdot\beta^*_{I^++2}\gamma^*_{I^--2}\beta^*_1\gamma^*_{\mathrm{screen},1}\Phi_\alpha\,.$$

where

$$\tilde{C}_{1,0}(\alpha) = -\Gamma(\nu)^{2\alpha+2\frac{1-\nu}{\nu}}\frac{1}{2\nu}$$
$$\times\gamma\left(\frac{1}{2}-\frac{\alpha}{2}-\frac{1-\nu}{2\nu}\right)\gamma\left(\frac{\alpha}{2}+\frac{1-\nu}{2\nu}\right)\gamma\left(\nu-\nu\alpha\right),$$
$$\gamma(x)=\Gamma(x)/\Gamma(1-x).$$

Conjecture(screening operators)

The coefficients $\tilde{\omega}_{j,k}(\kappa,\alpha)$ are used to define the Wick pairing between β^*_{2j-1} and a new fermion $\gamma^*_{\mathrm{screen},k}$.

$$\beta^*_{I^+}\gamma^*_{I^-}\Phi_{\alpha+2\frac{1-\nu}{\nu}} \simeq \tilde{C}_{1,0}(\alpha)\cdot\beta^*_{I^++2}\gamma^*_{I^--2}\beta^*_1\gamma^*_{\mathrm{screen},1}\Phi_\alpha\,.$$

where

$$\tilde{C}_{1,0}(\alpha) = -\Gamma(\nu)^{2\alpha+2\frac{1-\nu}{\nu}}\frac{1}{2\nu}$$
$$\times\gamma\left(\frac{1}{2}-\frac{\alpha}{2}-\frac{1-\nu}{2\nu}\right)\gamma\left(\frac{\alpha}{2}+\frac{1-\nu}{2\nu}\right)\gamma\left(\nu-\nu\alpha\right),$$
$$\gamma(x) = \Gamma(x)/\Gamma(1-x).$$

Conjecture(screening operators)

The coefficients $\tilde{\omega}_{j,k}(\kappa,\alpha)$ are used to define the Wick pairing between β^*_{2j-1} and a new fermion $\gamma^*_{\mathrm{screen},k}$.

$$\beta^*_{I^+}\gamma^*_{I^-}\Phi_{\alpha+2\frac{1-\nu}{\nu}} \simeq \tilde{C}_{1,0}(\alpha)\cdot\beta^*_{I^++2}\gamma^*_{I^--2}\beta^*_1\gamma^*_{\mathrm{screen},1}\Phi_\alpha\,.$$

where

$$\tilde{C}_{1,0}(\alpha) = -\Gamma(\nu)^{2\alpha+2\frac{1-\nu}{\nu}}\frac{1}{2\nu}$$
$$\times\gamma\left(\frac{1}{2}-\frac{\alpha}{2}-\frac{1-\nu}{2\nu}\right)\gamma\left(\frac{\alpha}{2}+\frac{1-\nu}{2\nu}\right)\gamma\left(\nu-\nu\alpha\right),$$
$$\gamma(x) = \Gamma(x)/\Gamma(1-x).$$

Conjecture(screening operators)

The coefficients $\tilde{\omega}_{j,k}(\kappa,\alpha)$ are used to define the Wick pairing between β^*_{2j-1} and a new fermion $\gamma^*_{\text{screen},k}$.

$$\beta^*_{I^+}\gamma^*_{I^-}\Phi_{\alpha+2\frac{1-\nu}{\nu}} \simeq \tilde{C}_{1,0}(\alpha)\cdot\beta^*_{I^++2}\gamma^*_{I^--2}\beta^*_1\gamma^*_{\text{screen},1}\Phi_\alpha\,.$$

where

$$\tilde{C}_{1,0}(\alpha) = -\Gamma(\nu)^{2\alpha+2\frac{1-\nu}{\nu}}\frac{1}{2\nu}$$
$$\times\gamma\left(\frac{1}{2}-\frac{\alpha}{2}-\frac{1-\nu}{2\nu}\right)\gamma\left(\frac{\alpha}{2}+\frac{1-\nu}{2\nu}\right)\gamma\left(\nu-\nu\alpha\right),$$
$$\gamma(x) = \Gamma(x)/\Gamma(1-x).$$

Conjecture(screening operators)

The coefficients $\tilde{\omega}_{j,k}(\kappa,\alpha)$ are used to define the Wick pairing between β^*_{2j-1} and a new fermion $\gamma^*_{\mathrm{screen},k}$.

$$\beta^*_{I^+}\gamma^*_{I^-}\Phi_{\alpha+2\frac{1-\nu}{\nu}} \simeq \tilde{C}_{1,0}(\alpha)\cdot\beta^*_{I^++2}\gamma^*_{I^--2}\beta^*_1\gamma^*_{\mathrm{screen},1}\Phi_\alpha\,.$$

where

$$\tilde{C}_{1,0}(\alpha) = -\Gamma(\nu)^{2\alpha+2\frac{1-\nu}{\nu}}\frac{1}{2\nu}$$
$$\times\gamma\left(\frac{1}{2}-\frac{\alpha}{2}-\frac{1-\nu}{2\nu}\right)\gamma\left(\frac{\alpha}{2}+\frac{1-\nu}{2\nu}\right)\gamma\left(\nu-\nu\alpha\right),$$
$$\gamma(x)=\Gamma(x)/\Gamma(1-x).$$

Conjecture(screening operators)

The coefficients $\tilde{\omega}_{j,k}(\kappa,\alpha)$ are used to define the Wick pairing between β^*_{2j-1} and a new fermion $\gamma^*_{\mathrm{screen},k}$.

$$\beta^*_{I^+}\gamma^*_{I^-}\Phi_{\alpha+2\frac{1-\nu}{\nu}} \simeq \tilde{C}_{1,0}(\alpha)\cdot\beta^*_{I^++2}\gamma^*_{I^--2}\beta^*_1\gamma^*_{\mathrm{screen},1}\Phi_\alpha\,.$$

where

$$\tilde{C}_{1,0}(\alpha) = -\Gamma(\nu)^{2\alpha+2\frac{1-\nu}{\nu}}\frac{1}{2\nu}$$
$$\times\gamma\left(\frac{1}{2}-\frac{\alpha}{2}-\frac{1-\nu}{2\nu}\right)\gamma\left(\frac{\alpha}{2}+\frac{1-\nu}{2\nu}\right)\gamma\left(\nu-\nu\alpha\right),$$
$$\gamma(x)=\Gamma(x)/\Gamma(1-x).$$

Conjecture(screening operators)

The coefficients $\tilde{\omega}_{j,k}(\kappa,\alpha)$ are used to define the Wick pairing between β^*_{2j-1} and a new fermion $\gamma^*_{\mathrm{screen},k}$.

$$\beta^*_{I^+}\gamma^*_{I^-}\Phi_{\alpha+2\frac{1-\nu}{\nu}} \simeq \tilde{C}_{1,0}(\alpha)\cdot\beta^*_{I^+ +2}\gamma^*_{I^- -2}\beta^*_1\gamma^*_{\mathrm{screen},1}\Phi_\alpha\,.$$

where

$$\tilde{C}_{1,0}(\alpha) = -\Gamma(\nu)^{2\alpha+2\frac{1-\nu}{\nu}}\frac{1}{2\nu}$$
$$\times\gamma\left(\frac{1}{2}-\frac{\alpha}{2}-\frac{1-\nu}{2\nu}\right)\gamma\left(\frac{\alpha}{2}+\frac{1-\nu}{2\nu}\right)\gamma\left(\nu-\nu\alpha\right),$$
$$\gamma(x) = \Gamma(x)/\Gamma(1-x).$$

Conjecture(screening operators)

The coefficients $\tilde{\omega}_{j,k}(\kappa,\alpha)$ are used to define the Wick pairing between β^*_{2j-1} and a new fermion $\gamma^*_{\mathrm{screen},k}$.

$$\beta^*_{I^+}\gamma^*_{I^-}\Phi_{\alpha+2\frac{1-\nu}{\nu}} \simeq \tilde{C}_{1,0}(\alpha)\cdot\beta^*_{I^++2}\gamma^*_{I^--2}\beta^*_1\gamma^*_{\mathrm{screen},1}\Phi_\alpha\,.$$

where

$$\tilde{C}_{1,0}(\alpha) = -\Gamma(\nu)^{2\alpha+2\frac{1-\nu}{\nu}}\frac{1}{2\nu}$$
$$\times\gamma\left(\frac{1}{2}-\frac{\alpha}{2}-\frac{1-\nu}{2\nu}\right)\gamma\left(\frac{\alpha}{2}+\frac{1-\nu}{2\nu}\right)\gamma\left(\nu-\nu\alpha\right),$$
$$\gamma(x)=\Gamma(x)/\Gamma(1-x).$$

Conjecture(screening operators)

The coefficients $\tilde{\omega}_{j,k}(\kappa,\alpha)$ are used to define the Wick pairing between β^*_{2j-1} and a new fermion $\gamma^*_{\mathrm{screen},k}$.

$$\beta^*_{I^+}\gamma^*_{I^-}\Phi_{\alpha+2\frac{1-\nu}{\nu}} \simeq \tilde{C}_{1,0}(\alpha)\cdot\beta^*_{I^++2}\gamma^*_{I^--2}\beta^*_1\gamma^*_{\mathrm{screen},1}\Phi_\alpha\,.$$

where

$$\tilde{C}_{1,0}(\alpha) = -\Gamma(\nu)^{2\alpha+2\frac{1-\nu}{\nu}}\frac{1}{2\nu}$$
$$\times\gamma\left(\frac{1}{2}-\frac{\alpha}{2}-\frac{1-\nu}{2\nu}\right)\gamma\left(\frac{\alpha}{2}+\frac{1-\nu}{2\nu}\right)\gamma\left(\nu-\nu\alpha\right),$$
$$\gamma(x) = \Gamma(x)/\Gamma(1-x).$$

Conjecture(screening operators)

The coefficients $\tilde{\omega}_{j,k}(\kappa,\alpha)$ are used to define the Wick pairing between β^*_{2j-1} and a new fermion $\gamma^*_{\mathrm{screen},k}$.

$$\beta^*_{I^+}\gamma^*_{I^-}\Phi_{\alpha+2\frac{1-\nu}{\nu}} \simeq \tilde{C}_{1,0}(\alpha)\cdot\beta^*_{I^++2}\gamma^*_{I^--2}\beta^*_1\gamma^*_{\mathrm{screen},1}\Phi_\alpha\,.$$

where

$$\tilde{C}_{1,0}(\alpha) = -\Gamma(\nu)^{2\alpha+2\frac{1-\nu}{\nu}}\frac{1}{2\nu}$$
$$\times\gamma\left(\frac{1}{2}-\frac{\alpha}{2}-\frac{1-\nu}{2\nu}\right)\gamma\left(\frac{\alpha}{2}+\frac{1-\nu}{2\nu}\right)\gamma\left(\nu-\nu\alpha\right),$$
$$\gamma(x)=\Gamma(x)/\Gamma(1-x).$$

Conjecture(screening operators)

The coefficients $\tilde{\omega}_{j,k}(\kappa,\alpha)$ are used to define the Wick pairing between β^*_{2j-1} and a new fermion $\gamma^*_{\mathrm{screen},k}$.

$$\beta^*_{I^+}\gamma^*_{I^-}\Phi_{\alpha+2\frac{1-\nu}{\nu}} \simeq \tilde{C}_{1,0}(\alpha)\cdot\beta^*_{I^++2}\gamma^*_{I^--2}\beta^*_1\gamma^*_{\mathrm{screen},1}\Phi_\alpha\,.$$

where

$$\tilde{C}_{1,0}(\alpha) = -\Gamma(\nu)^{2\alpha+2\frac{1-\nu}{\nu}}\frac{1}{2\nu}$$
$$\times\gamma\left(\frac{1}{2}-\frac{\alpha}{2}-\frac{1-\nu}{2\nu}\right)\gamma\left(\frac{\alpha}{2}+\frac{1-\nu}{2\nu}\right)\gamma\left(\nu-\nu\alpha\right),$$
$$\gamma(x) = \Gamma(x)/\Gamma(1-x).$$

Conjecture(screening operators)

The coefficients $\tilde{\omega}_{j,k}(\kappa,\alpha)$ are used to define the Wick pairing between β^*_{2j-1} and a new fermion $\gamma^*_{\text{screen},k}$.

$$\beta^*_{I^+}\gamma^*_{I^-}\Phi_{\alpha+2\frac{1-\nu}{\nu}} \simeq \tilde{C}_{1,0}(\alpha)\cdot\beta^*_{I^++2}\gamma^*_{I^--2}\beta^*_1\gamma^*_{\text{screen},1}\Phi_\alpha\,.$$

where

$$\tilde{C}_{1,0}(\alpha) = -\Gamma(\nu)^{2\alpha+2\frac{1-\nu}{\nu}}\frac{1}{2\nu}$$
$$\times\gamma\left(\frac{1}{2}-\frac{\alpha}{2}-\frac{1-\nu}{2\nu}\right)\gamma\left(\frac{\alpha}{2}+\frac{1-\nu}{2\nu}\right)\gamma\left(\nu-\nu\alpha\right),$$
$$\gamma(x)=\Gamma(x)/\Gamma(1-x).$$

Conjecture(screening operators)

The coefficients $\tilde{\omega}_{j,k}(\kappa,\alpha)$ are used to define the Wick pairing between β^*_{2j-1} and a new fermion $\gamma^*_{\mathrm{screen},k}$.

$$\beta^*_{I^+}\gamma^*_{I^-}\Phi_{\alpha+2\frac{1-\nu}{\nu}} \simeq \tilde{C}_{1,0}(\alpha)\cdot\beta^*_{I^++2}\gamma^*_{I^--2}\beta^*_1\gamma^*_{\mathrm{screen},1}\Phi_\alpha\,.$$

where

$$\tilde{C}_{1,0}(\alpha) = -\Gamma(\nu)^{2\alpha+2\frac{1-\nu}{\nu}}\frac{1}{2\nu}$$
$$\times\gamma\left(\frac{1}{2}-\frac{\alpha}{2}-\frac{1-\nu}{2\nu}\right)\gamma\left(\frac{\alpha}{2}+\frac{1-\nu}{2\nu}\right)\gamma\left(\nu-\nu\alpha\right),$$
$$\gamma(x)=\Gamma(x)/\Gamma(1-x).$$

Conjecture(screening operators)

The coefficients $\tilde{\omega}_{j,k}(\kappa,\alpha)$ are used to define the Wick pairing between β^*_{2j-1} and a new fermion $\gamma^*_{\mathrm{screen},k}$.

$$\beta^*_{I^+}\gamma^*_{I^-}\Phi_{\alpha+2\frac{1-\nu}{\nu}} \simeq \tilde{C}_{1,0}(\alpha)\cdot\beta^*_{I^++2}\gamma^*_{I^--2}\beta^*_1\gamma^*_{\mathrm{screen},1}\Phi_\alpha\,.$$

where

$$\tilde{C}_{1,0}(\alpha) = -\Gamma(\nu)^{2\alpha+2\frac{1-\nu}{\nu}}\frac{1}{2\nu}$$
$$\times\gamma\left(\frac{1}{2}-\frac{\alpha}{2}-\frac{1-\nu}{2\nu}\right)\gamma\left(\frac{\alpha}{2}+\frac{1-\nu}{2\nu}\right)\gamma\left(\nu-\nu\alpha\right),$$
$$\gamma(x)=\Gamma(x)/\Gamma(1-x).$$

Conjecture(screening operators)

The coefficients $\tilde{\omega}_{j,k}(\kappa,\alpha)$ are used to define the Wick pairing between β^*_{2j-1} and a new fermion $\gamma^*_{\mathrm{screen},k}$.

$$\beta^*_{I^+}\gamma^*_{I^-}\Phi_{\alpha+2\frac{1-\nu}{\nu}} \simeq \tilde{C}_{1,0}(\alpha)\cdot\beta^*_{I^++2}\gamma^*_{I^--2}\beta^*_1\gamma^*_{\mathrm{screen},1}\Phi_\alpha\,.$$

where

$$\tilde{C}_{1,0}(\alpha) = -\Gamma(\nu)^{2\alpha+2\frac{1-\nu}{\nu}}\frac{1}{2\nu}$$
$$\times\gamma\left(\frac{1}{2}-\frac{\alpha}{2}-\frac{1-\nu}{2\nu}\right)\gamma\left(\frac{\alpha}{2}+\frac{1-\nu}{2\nu}\right)\gamma\left(\nu-\nu\alpha\right)\,,$$
$$\gamma(x)=\Gamma(x)/\Gamma(1-x).$$

Conjecture(screening operators)

The coefficients $\tilde{\omega}_{j,k}(\kappa,\alpha)$ are used to define the Wick pairing between β^*_{2j-1} and a new fermion $\gamma^*_{\mathrm{screen},k}$.

$$\beta^*_{I^+}\gamma^*_{I^-}\Phi_{\alpha+2\frac{1-\nu}{\nu}} \simeq \tilde{C}_{1,0}(\alpha)\cdot\beta^*_{I^+ +2}\gamma^*_{I^- -2}\beta^*_1\gamma^*_{\mathrm{screen},1}\Phi_\alpha\,.$$

where

$$\tilde{C}_{1,0}(\alpha) = -\Gamma(\nu)^{2\alpha+2\frac{1-\nu}{\nu}}\frac{1}{2\nu}$$
$$\times\gamma\left(\frac{1}{2}-\frac{\alpha}{2}-\frac{1-\nu}{2\nu}\right)\gamma\left(\frac{\alpha}{2}+\frac{1-\nu}{2\nu}\right)\gamma\left(\nu-\nu\alpha\right),$$
$$\gamma(x)=\Gamma(x)/\Gamma(1-x).$$

Conjecture(screening operators)

The coefficients $\tilde{\omega}_{j,k}(\kappa,\alpha)$ are used to define the Wick pairing between β^*_{2j-1} and a new fermion $\gamma^*_{\mathrm{screen},k}$.

$$\beta^*_{I^+}\gamma^*_{I^-}\Phi_{\alpha+2\frac{1-\nu}{\nu}} \simeq \tilde{C}_{1,0}(\alpha)\cdot\beta^*_{I^++2}\gamma^*_{I^--2}\beta^*_1\gamma^*_{\mathrm{screen},1}\Phi_\alpha\,.$$

where

$$\tilde{C}_{1,0}(\alpha) = -\Gamma(\nu)^{2\alpha+2\frac{1-\nu}{\nu}}\frac{1}{2\nu}$$
$$\times\gamma\left(\frac{1}{2}-\frac{\alpha}{2}-\frac{1-\nu}{2\nu}\right)\gamma\left(\frac{\alpha}{2}+\frac{1-\nu}{2\nu}\right)\gamma\left(\nu-\nu\alpha\right),$$
$$\gamma(x)=\Gamma(x)/\Gamma(1-x).$$

Conjecture(screening operators)

The coefficients $\tilde{\omega}_{j,k}(\kappa,\alpha)$ are used to define the Wick pairing between β^*_{2j-1} and a new fermion $\gamma^*_{\mathrm{screen},k}$.

$$\beta^*_{I^+}\gamma^*_{I^-}\Phi_{\alpha+2\frac{1-\nu}{\nu}} \simeq \tilde{C}_{1,0}(\alpha)\cdot\beta^*_{I^++2}\gamma^*_{I^--2}\beta^*_1\gamma^*_{\mathrm{screen},1}\Phi_\alpha\,.$$

where

$$\tilde{C}_{1,0}(\alpha) = -\Gamma(\nu)^{2\alpha+2\frac{1-\nu}{\nu}}\frac{1}{2\nu}$$
$$\times\gamma\left(\frac{1}{2}-\frac{\alpha}{2}-\frac{1-\nu}{2\nu}\right)\gamma\left(\frac{\alpha}{2}+\frac{1-\nu}{2\nu}\right)\gamma\left(\nu-\nu\alpha\right),$$
$$\gamma(x) = \Gamma(x)/\Gamma(1-x).$$

Scaling limit to sG model

Scaling limit to sG model

Start with the 6 vertex model with alternating inhomogeneity parameters ζ_0, ζ_0^{-1} in both directions. The sine-Gordon model is obtained as a scaling limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta_0 = \left(\frac{4}{aM}\right)^{\nu} \to \infty\,.$$

with $R, M > 0$ fixed. $(M = M_{\mathrm{soliton}})$

Scaling limit to sG model

Start with the 6 vertex model with alternating inhomogeneity parameters ζ_0, ζ_0^{-1} in both directions. The sine-Gordon model is obtained as a scaling limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta_0 = \left(\frac{4}{aM}\right)^{\nu} \to \infty\,,$$

with $R, M > 0$ fixed. $(M = M_{\text{soliton}})$

Scaling limit to sG model

Start with the 6 vertex model with alternating inhomogeneity parameters ζ_0, ζ_0^{-1} in both directions. The sine-Gordon model is obtained as a scaling limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta_0 = \left(\frac{4}{aM}\right)^{\nu} \to \infty\,,$$

with $R, M > 0$ fixed. $(M = M_{\mathrm{soliton}})$

Scaling limit to sG model

Start with the 6 vertex model with alternating inhomogeneity parameters ζ_0, ζ_0^{-1} in both directions. The sine-Gordon model is obtained as a scaling limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta_0 = \left(\frac{4}{aM}\right)^{\nu} \to \infty\,.$$

with $R, M > 0$ fixed. $(M = M_{\text{soliton}})$

Scaling limit to sG model

Start with the 6 vertex model with alternating inhomogeneity parameters ζ_0, ζ_0^{-1} in both directions. The sine-Gordon model is obtained as a scaling limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta_0 = \left(\frac{4}{aM}\right)^{\nu} \to \infty\,,$$

with $R, M > 0$ fixed. $(M = M_{\text{soliton}})$

Scaling limit to sG model

Start with the 6 vertex model with alternating inhomogeneity parameters ζ_0, ζ_0^{-1} in both directions. The sine-Gordon model is obtained as a scaling limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta_0 = \left(\frac{4}{aM}\right)^{\nu} \to \infty\,,$$

with $R, M > 0$ fixed. $(M = M_{\mathrm{soliton}})$

Scaling limit to sG model

Start with the 6 vertex model with alternating inhomogeneity parameters ζ_0, ζ_0^{-1} in both directions. The sine-Gordon model is obtained as a scaling limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta_0 = \left(\frac{4}{aM}\right)^{\nu} \to \infty\,,$$

with $R, M > 0$ fixed. $(M = M_{\text{soliton}})$

Scaling limit to sG model

Start with the 6 vertex model with alternating inhomogeneity parameters ζ_0, ζ_0^{-1} in both directions. The sine-Gordon model is obtained as a scaling limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0, \quad \zeta_0 = \left(\frac{4}{aM}\right)^{\nu} \to \infty,$$

with $R, M > 0$ fixed. $(M = M_{\text{soliton}})$

Scaling limit to sG model

Start with the 6 vertex model with alternating inhomogeneity parameters ζ_0, ζ_0^{-1} in both directions. The sine-Gordon model is obtained as a scaling limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta_0 = \left(\frac{4}{aM}\right)^{\nu} \to \infty\,,$$

with $R, M > 0$ fixed. $(M = M_{\mathrm{soliton}})$

Scaling limit to sG model

Start with the 6 vertex model with alternating inhomogeneity parameters ζ_0, ζ_0^{-1} in both directions. The sine-Gordon model is obtained as a scaling limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta_0 = \left(\frac{4}{aM}\right)^{\nu} \to \infty\,,$$

with $R, M > 0$ fixed. $(M = M_{\mathrm{soliton}})$

Scaling limit to sG model

Start with the 6 vertex model with alternating inhomogeneity parameters ζ_0, ζ_0^{-1} in both directions. The sine-Gordon model is obtained as a scaling limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta_0 = \left(\frac{4}{aM}\right)^{\nu} \to \infty\,,$$

with $R, M > 0$ fixed. ($M = M_{\mathrm{soliton}}$)

Scaling limit to sG model

Start with the 6 vertex model with alternating inhomogeneity parameters ζ_0, ζ_0^{-1} in both directions. The sine-Gordon model is obtained as a scaling limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta_0 = \left(\frac{4}{aM}\right)^{\nu} \to \infty\,,$$

with $R, M > 0$ fixed. $(M = M_{\text{soliton}})$

Scaling limit to sG model

Start with the 6 vertex model with alternating inhomogeneity parameters ζ_0, ζ_0^{-1} in both directions. The sine-Gordon model is obtained as a scaling limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0, \quad \zeta_0 = \left(\frac{4}{aM}\right)^{\nu} \to \infty,$$

with $R, M > 0$ fixed. $(M = M_{\mathrm{soliton}})$

Scaling limit to sG model

Start with the 6 vertex model with alternating inhomogeneity parameters ζ_0, ζ_0^{-1} in both directions. The sine-Gordon model is obtained as a scaling limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta_0 = \left(\frac{4}{aM}\right)^{\nu} \to \infty\,,$$

with $R, M > 0$ fixed. ($M = M_{\text{soliton}}$)

Scaling limit to sG model

Start with the 6 vertex model with alternating inhomogeneity parameters ζ_0, ζ_0^{-1} in both directions. The sine-Gordon model is obtained as a scaling limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta_0 = \left(\frac{4}{aM}\right)^{\nu} \to \infty\,,$$

with $R, M > 0$ fixed. $(M = M_{\mathrm{soliton}})$

Scaling limit to sG model

Start with the 6 vertex model with alternating inhomogeneity parameters ζ_0, ζ_0^{-1} in both directions. The sine-Gordon model is obtained as a scaling limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta_0 = \left(\frac{4}{aM}\right)^{\nu} \to \infty\,,$$

with $R, M > 0$ fixed. $(M = M_{\mathrm{soliton}})$

Scaling limit to sG model

Start with the 6 vertex model with alternating inhomogeneity parameters ζ_0, ζ_0^{-1} in both directions. The sine-Gordon model is obtained as a scaling limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta_0 = \left(\frac{4}{aM}\right)^{\nu} \to \infty\,,$$

with $R, M > 0$ fixed. $(M = M_{\mathrm{soliton}})$

Scaling limit to sG model

Start with the 6 vertex model with alternating inhomogeneity parameters ζ_0, ζ_0^{-1} in both directions. The sine-Gordon model is obtained as a scaling limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0, \quad \zeta_0 = \left(\frac{4}{aM}\right)^{\nu} \to \infty,$$

with $R, M > 0$ fixed. ($M = M_{\mathrm{soliton}}$)

Scaling limit to sG model

Start with the 6 vertex model with alternating inhomogeneity parameters ζ_0, ζ_0^{-1} in both directions. The sine-Gordon model is obtained as a scaling limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta_0 = \left(\frac{4}{aM}\right)^{\nu} \to \infty\,,$$

with $R, M > 0$ fixed. $(M = M_{\text{soliton}})$

Scaling limit to sG model

Start with the 6 vertex model with alternating inhomogeneity parameters ζ_0, ζ_0^{-1} in both directions. The sine-Gordon model is obtained as a scaling limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta_0 = \left(\frac{4}{aM}\right)^{\nu} \to \infty\,,$$

with $R, M > 0$ fixed. $(M = M_{\text{soliton}})$

Scaling limit to sG model

Start with the 6 vertex model with alternating inhomogeneity parameters ζ_0, ζ_0^{-1} in both directions. The sine-Gordon model is obtained as a scaling limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta_0 = \left(\frac{4}{aM}\right)^{\nu} \to \infty\,,$$

with $R, M > 0$ fixed. $(M = M_{\mathrm{soliton}})$

Scaling limit to sG model

Start with the 6 vertex model with alternating inhomogeneity parameters ζ_0, ζ_0^{-1} in both directions. The sine-Gordon model is obtained as a scaling limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta_0 = \left(\frac{4}{aM}\right)^{\nu} \to \infty\,,$$

with $R, M > 0$ fixed. $(M = M_{\mathrm{soliton}})$

Scaling limit to sG model

Start with the 6 vertex model with alternating inhomogeneity parameters ζ_0, ζ_0^{-1} in both directions. The sine-Gordon model is obtained as a scaling limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0, \quad \zeta_0 = \left(\frac{4}{aM}\right)^{\nu} \to \infty,$$

with $R, M > 0$ fixed. $(M = M_{\rm soliton})$

Scaling limit to sG model

Start with the 6 vertex model with alternating inhomogeneity parameters ζ_0, ζ_0^{-1} in both directions. The sine-Gordon model is obtained as a scaling limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta_0 = \left(\frac{4}{aM}\right)^{\nu} \to \infty\,,$$

with $R, M > 0$ fixed. $(M = M_{\text{soliton}})$

Scaling limit to sG model

Start with the 6 vertex model with alternating inhomogeneity parameters ζ_0, ζ_0^{-1} in both directions. The sine-Gordon model is obtained as a scaling limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta_0 = \left(\frac{4}{aM}\right)^{\nu} \to \infty\,,$$

with $R, M > 0$ fixed. $(M = M_{\mathrm{soliton}})$

Scaling limit to sG model

Start with the 6 vertex model with alternating inhomogeneity parameters ζ_0, ζ_0^{-1} in both directions. The sine-Gordon model is obtained as a scaling limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta_0 = \left(\frac{4}{aM}\right)^{\nu} \to \infty\,,$$

with $R, M > 0$ fixed. ($M = M_{\mathrm{soliton}}$)

Scaling limit to sG model

Start with the 6 vertex model with alternating inhomogeneity parameters ζ_0, ζ_0^{-1} in both directions. The sine-Gordon model is obtained as a scaling limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0, \quad \zeta_0 = \left(\frac{4}{aM}\right)^{\nu} \to \infty,$$

with $R, M > 0$ fixed. ($M = M_{\mathrm{soliton}}$)

Scaling limit to sG model

Start with the 6 vertex model with alternating inhomogeneity parameters ζ_0, ζ_0^{-1} in both directions. The sine-Gordon model is obtained as a scaling limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta_0 = \left(\frac{4}{aM}\right)^{\nu} \to \infty\,,$$

with $R, M > 0$ fixed. $(M = M_{\text{soliton}})$

Scaling limit to sG model

Start with the 6 vertex model with alternating inhomogeneity parameters ζ_0, ζ_0^{-1} in both directions. The sine-Gordon model is obtained as a scaling limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0, \quad \zeta_0 = \left(\frac{4}{aM}\right)^{\nu} \to \infty,$$

with $R, M > 0$ fixed. $(M = M_{\mathrm{soliton}})$

Scaling limit to sG model

Start with the 6 vertex model with alternating inhomogeneity parameters ζ_0, ζ_0^{-1} in both directions. The sine-Gordon model is obtained as a scaling limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta_0 = \left(\frac{4}{aM}\right)^{\nu} \to \infty\,,$$

with $R, M > 0$ fixed. $(M = M_{\rm soliton})$

Scaling limit to sG model

Start with the 6 vertex model with alternating inhomogeneity parameters ζ_0, ζ_0^{-1} in both directions. The sine-Gordon model is obtained as a scaling limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta_0 = \left(\frac{4}{aM}\right)^{\nu} \to \infty\,.$$

with $R, M > 0$ fixed. $(M = M_{\rm soliton})$

Scaling limit to sG model

Start with the 6 vertex model with alternating inhomogeneity parameters ζ_0, ζ_0^{-1} in both directions. The sine-Gordon model is obtained as a scaling limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0, \quad \zeta_0 = \left(\frac{4}{aM}\right)^{\nu} \to \infty,$$

with $R, M > 0$ fixed. ($M = M_{\text{soliton}}$)

Repeating the same procedure (there are tricky points), one can introduce fermions

$$\beta^*_{2j-1}, \quad \gamma^*_{2j-1}, \quad \bar{\beta}^*_{2j-1}, \quad \bar{\gamma}^*_{2j-1},$$
$$\beta^*_{\text{screen},j}, \quad \gamma^*_{\text{screen},j}, \quad \bar{\beta}^*_{\text{screen},j}, \quad \bar{\gamma}^*_{\text{screen},j}.$$

Scaling limit to sG model

Start with the 6 vertex model with alternating inhomogeneity parameters ζ_0, ζ_0^{-1} in both directions. The sine-Gordon model is obtained as a scaling limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0, \quad \zeta_0 = \left(\frac{4}{aM}\right)^{\nu} \to \infty,$$

with $R, M > 0$ fixed. $(M = M_{\text{soliton}})$

Repeating the same procedure (there are tricky points), one can introduce fermions

$$\beta^*_{2j-1}, \quad \gamma^*_{2j-1}, \quad \bar{\beta}^*_{2j-1}, \quad \bar{\gamma}^*_{2j-1},$$
$$\beta^*_{\text{screen},j}, \quad \gamma^*_{\text{screen},j}, \quad \bar{\beta}^*_{\text{screen},j}, \quad \bar{\gamma}^*_{\text{screen},j}.$$

Scaling limit to sG model

Start with the 6 vertex model with alternating inhomogeneity parameters ζ_0, ζ_0^{-1} in both directions. The sine-Gordon model is obtained as a scaling limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0, \quad \zeta_0 = \left(\frac{4}{aM}\right)^{\nu} \to \infty,$$

with $R, M > 0$ fixed. ($M = M_{\rm soliton}$)

Repeating the same procedure (there are tricky points), one can introduce fermions

$$\beta^*_{2j-1}, \quad \gamma^*_{2j-1}, \quad \bar{\beta}^*_{2j-1}, \quad \bar{\gamma}^*_{2j-1},$$
$$\beta^*_{{\rm screen},j}, \quad \gamma^*_{{\rm screen},j}, \quad \bar{\beta}^*_{{\rm screen},j}, \quad \bar{\gamma}^*_{{\rm screen},j}.$$

Scaling limit to sG model

Start with the 6 vertex model with alternating inhomogeneity parameters ζ_0, ζ_0^{-1} in both directions. The sine-Gordon model is obtained as a scaling limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0, \quad \zeta_0 = \left(\frac{4}{aM}\right)^{\nu} \to \infty,$$

with $R, M > 0$ fixed. ($M = M_{\mathrm{soliton}}$)

Repeating the same procedure (there are tricky points), one can introduce fermions

$$\beta^*_{2j-1}, \quad \gamma^*_{2j-1}, \quad \bar{\beta}^*_{2j-1}, \quad \bar{\gamma}^*_{2j-1},$$
$$\beta^*_{\mathrm{screen},j}, \quad \gamma^*_{\mathrm{screen},j}, \quad \bar{\beta}^*_{\mathrm{screen},j}, \quad \bar{\gamma}^*_{\mathrm{screen},j}.$$

Scaling limit to sG model

Start with the 6 vertex model with alternating inhomogeneity parameters ζ_0, ζ_0^{-1} in both directions. The sine-Gordon model is obtained as a scaling limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0, \quad \zeta_0 = \left(\frac{4}{aM}\right)^{\nu} \to \infty,$$

with $R, M > 0$ fixed. ($M = M_{\mathrm{soliton}}$)

Repeating the same procedure (there are tricky points), one can introduce fermions

$$\beta^*_{2j-1}, \quad \gamma^*_{2j-1}, \quad \bar{\beta}^*_{2j-1}, \quad \bar{\gamma}^*_{2j-1},$$
$$\beta^*_{\mathrm{screen},j}, \quad \gamma^*_{\mathrm{screen},j}, \quad \bar{\beta}^*_{\mathrm{screen},j}, \quad \bar{\gamma}^*_{\mathrm{screen},j}.$$

Scaling limit to sG model

Start with the 6 vertex model with alternating inhomogeneity parameters ζ_0, ζ_0^{-1} in both directions. The sine-Gordon model is obtained as a scaling limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0, \quad \zeta_0 = \left(\frac{4}{aM}\right)^{\nu} \to \infty,$$

with $R, M > 0$ fixed. $(M = M_{\text{soliton}})$

Repeating the same procedure (there are tricky points), one can introduce fermions

$$\beta^*_{2j-1}, \quad \gamma^*_{2j-1}, \quad \bar{\beta}^*_{2j-1}, \quad \bar{\gamma}^*_{2j-1},$$
$$\beta^*_{\text{screen},j}, \quad \gamma^*_{\text{screen},j}, \quad \bar{\beta}^*_{\text{screen},j}, \quad \bar{\gamma}^*_{\text{screen},j}.$$

Scaling limit to sG model

Start with the 6 vertex model with alternating inhomogeneity parameters ζ_0, ζ_0^{-1} in both directions. The sine-Gordon model is obtained as a scaling limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta_0 = \left(\frac{4}{aM}\right)^{\nu} \to \infty\,,$$

with $R, M > 0$ fixed. ($M = M_{\mathrm{soliton}}$)

Repeating the same procedure (there are tricky points), one can introduce fermions

$$\beta^*_{2j-1}, \quad \gamma^*_{2j-1}, \quad \bar{\beta}^*_{2j-1}, \quad \bar{\gamma}^*_{2j-1}\,,$$
$$\beta^*_{\mathrm{screen},j}, \quad \gamma^*_{\mathrm{screen},j}, \quad \bar{\beta}^*_{\mathrm{screen},j}, \quad \bar{\gamma}^*_{\mathrm{screen},j}\,.$$

Scaling limit to sG model

Start with the 6 vertex model with alternating inhomogeneity parameters ζ_0, ζ_0^{-1} in both directions. The sine-Gordon model is obtained as a scaling limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta_0 = \left(\frac{4}{aM}\right)^{\nu} \to \infty\,,$$

with $R, M > 0$ fixed. $(M = M_{\rm soliton})$

Repeating the same procedure (there are tricky points), one can introduce fermions

$$\beta^*_{2j-1}, \quad \gamma^*_{2j-1}, \quad \bar{\beta}^*_{2j-1}, \quad \bar{\gamma}^*_{2j-1}\,,$$
$$\beta^*_{\mathrm{screen},j}, \quad \gamma^*_{\mathrm{screen},j}, \quad \bar{\beta}^*_{\mathrm{screen},j}, \quad \bar{\gamma}^*_{\mathrm{screen},j}\,.$$

Scaling limit to sG model

Start with the 6 vertex model with alternating inhomogeneity parameters ζ_0, ζ_0^{-1} in both directions. The sine-Gordon model is obtained as a scaling limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0, \quad \zeta_0 = \left(\frac{4}{aM}\right)^{\nu} \to \infty,$$

with $R, M > 0$ fixed. ($M = M_{\mathrm{soliton}}$)

Repeating the same procedure (there are tricky points), one can introduce fermions

$$\beta^*_{2j-1}, \quad \gamma^*_{2j-1}, \quad \bar{\beta}^*_{2j-1}, \quad \bar{\gamma}^*_{2j-1},$$
$$\beta^*_{\mathrm{screen},j}, \quad \gamma^*_{\mathrm{screen},j}, \quad \bar{\beta}^*_{\mathrm{screen},j}, \quad \bar{\gamma}^*_{\mathrm{screen},j}.$$

Scaling limit to sG model

Start with the 6 vertex model with alternating inhomogeneity parameters ζ_0, ζ_0^{-1} in both directions. The sine-Gordon model is obtained as a scaling limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0, \quad \zeta_0 = \left(\frac{4}{aM}\right)^{\nu} \to \infty,$$

with $R, M > 0$ fixed. $(M = M_{\mathrm{soliton}})$

Repeating the same procedure (there are tricky points), one can introduce fermions

$$\beta^*_{2j-1}, \quad \gamma^*_{2j-1}, \quad \bar{\beta}^*_{2j-1}, \quad \bar{\gamma}^*_{2j-1},$$
$$\beta^*_{\mathrm{screen},j}, \quad \gamma^*_{\mathrm{screen},j}, \quad \bar{\beta}^*_{\mathrm{screen},j}, \quad \bar{\gamma}^*_{\mathrm{screen},j}.$$

Scaling limit to sG model

Start with the 6 vertex model with alternating inhomogeneity parameters ζ_0, ζ_0^{-1} in both directions. The sine-Gordon model is obtained as a scaling limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta_0 = \left(\frac{4}{aM}\right)^{\nu} \to \infty\,,$$

with $R, M > 0$ fixed. $(M = M_{\mathrm{soliton}})$

Repeating the same procedure (there are tricky points), one can introduce fermions

$$\beta^*_{2j-1}, \quad \gamma^*_{2j-1}, \quad \bar{\beta}^*_{2j-1}, \quad \bar{\gamma}^*_{2j-1}\,,$$
$$\beta^*_{\mathrm{screen},j}, \quad \gamma^*_{\mathrm{screen},j}, \quad \bar{\beta}^*_{\mathrm{screen},j}, \quad \bar{\gamma}^*_{\mathrm{screen},j}\,.$$

Scaling limit to sG model

Start with the 6 vertex model with alternating inhomogeneity parameters ζ_0, ζ_0^{-1} in both directions. The sine-Gordon model is obtained as a scaling limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0, \quad \zeta_0 = \left(\frac{4}{aM}\right)^{\nu} \to \infty,$$

with $R, M > 0$ fixed. ($M = M_{\text{soliton}}$)

Repeating the same procedure (there are tricky points), one can introduce fermions

$$\beta^*_{2j-1}, \quad \gamma^*_{2j-1}, \quad \bar{\beta}^*_{2j-1}, \quad \bar{\gamma}^*_{2j-1},$$
$$\beta^*_{\text{screen},j}, \quad \gamma^*_{\text{screen},j}, \quad \bar{\beta}^*_{\text{screen},j}, \quad \bar{\gamma}^*_{\text{screen},j}.$$

Scaling limit to sG model

Start with the 6 vertex model with alternating inhomogeneity parameters ζ_0, ζ_0^{-1} in both directions. The sine-Gordon model is obtained as a scaling limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta_0 = \left(\frac{4}{aM}\right)^{\nu} \to \infty\,,$$

with $R, M > 0$ fixed. ($M = M_{\text{soliton}}$)

Repeating the same procedure (there are tricky points), one can introduce fermions

$$\beta^*_{2j-1}, \quad \gamma^*_{2j-1}, \quad \bar{\beta}^*_{2j-1}, \quad \bar{\gamma}^*_{2j-1}\,,$$
$$\beta^*_{\text{screen},j}, \quad \gamma^*_{\text{screen},j}, \quad \bar{\beta}^*_{\text{screen},j}, \quad \bar{\gamma}^*_{\text{screen},j}\,.$$

Scaling limit to sG model

Start with the 6 vertex model with alternating inhomogeneity parameters ζ_0, ζ_0^{-1} in both directions. The sine-Gordon model is obtained as a scaling limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0, \quad \zeta_0 = \left(\frac{4}{aM}\right)^{\nu} \to \infty,$$

with $R, M > 0$ fixed. ($M = M_{\rm soliton}$)

Repeating the same procedure (there are tricky points), one can introduce fermions

$$\beta^*_{2j-1}, \quad \gamma^*_{2j-1}, \quad \bar{\beta}^*_{2j-1}, \quad \bar{\gamma}^*_{2j-1},$$
$$\beta^*_{{\rm screen},j}, \quad \gamma^*_{{\rm screen},j}, \quad \bar{\beta}^*_{{\rm screen},j}, \quad \bar{\gamma}^*_{{\rm screen},j}.$$

Scaling limit to sG model

Start with the 6 vertex model with alternating inhomogeneity parameters ζ_0, ζ_0^{-1} in both directions. The sine-Gordon model is obtained as a scaling limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0\,, \quad \zeta_0 = \left(\frac{4}{aM}\right)^{\nu} \to \infty\,,$$

with $R, M > 0$ fixed. $(M = M_{\mathrm{soliton}})$

Repeating the same procedure (there are tricky points), one can introduce fermions

$$\beta^*_{2j-1}, \quad \gamma^*_{2j-1}, \quad \bar{\beta}^*_{2j-1}, \quad \bar{\gamma}^*_{2j-1}\,,$$
$$\beta^*_{\mathrm{screen},j}, \quad \gamma^*_{\mathrm{screen},j}, \quad \bar{\beta}^*_{\mathrm{screen},j}, \quad \bar{\gamma}^*_{\mathrm{screen},j}\,.$$

Scaling limit to sG model

Start with the 6 vertex model with alternating inhomogeneity parameters ζ_0, ζ_0^{-1} in both directions. The sine-Gordon model is obtained as a scaling limit

$$a = \frac{2\pi R}{\mathbf{n}} \to 0, \quad \zeta_0 = \left(\frac{4}{aM}\right)^{\nu} \to \infty,$$

with $R, M > 0$ fixed. $(M = M_{\mathrm{soliton}})$

Repeating the same procedure (there are tricky points), one can introduce fermions

$$\beta^{*}_{2j-1}, \quad \gamma^{*}_{2j-1}, \quad \bar{\beta}^{*}_{2j-1}, \quad \bar{\gamma}^{*}_{2j-1},$$
$$\beta^{*}_{\mathrm{screen},j}, \quad \gamma^{*}_{\mathrm{screen},j}, \quad \bar{\beta}^{*}_{\mathrm{screen},j}, \quad \bar{\gamma}^{*}_{\mathrm{screen},j}.$$

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R = \infty$.

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R = \infty$.

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R = \infty$.

- For $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$ we have

$$\frac{\langle \beta^*_{J^+}\gamma^*_{J^-}\bar{\beta}^*_{\bar{J}^+}\bar{\gamma}^*_{\bar{J}^-}\Phi_\alpha\rangle}{\langle\Phi_\alpha\rangle} = \mu^{2\nu^{-1}(\sum_{a\in J^+} a + \sum_{b\in J^+} b)}$$

$$\times \prod_{a\in J^+} \frac{i}{\nu}\cot\frac{\pi}{2\nu}(a+\nu\alpha) \prod_{b\in J^-} \frac{i}{\nu}\cot\frac{\pi}{2\nu}(b-\nu\alpha)\,.$$

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R = \infty$.

- For $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$ we have

$$\frac{\langle \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha \rangle}{\langle \Phi_\alpha \rangle} = \mu^{2\nu^{-1}(\sum_{a\in J^+} a + \sum_{b \in J^+} b)}$$

$$\times \prod_{a\in J^+} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(a+\nu\alpha) \prod_{b\in J^-} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(b-\nu\alpha) .$$

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R = \infty$.

- For $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$ we have

$$\frac{\langle \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha \rangle}{\langle \Phi_\alpha \rangle} = \mu^{2\nu^{-1}(\sum_{a \in J^+} a + \sum_{b \in J^+} b)}$$

$$\times \prod_{a \in J^+} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(a + \nu\alpha) \prod_{b \in J^-} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(b - \nu\alpha) .$$

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R = \infty$.

- For $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$ we have

$$\frac{\langle \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha \rangle}{\langle \Phi_\alpha \rangle} = \mu^{2\nu^{-1}(\sum_{a \in J^+} a + \sum_{b \in J^+} b)}$$

$$\times \prod_{a \in J^+} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(a + \nu\alpha) \prod_{b \in J^-} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(b - \nu\alpha) .$$

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R = \infty$.

- For $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$ we have

$$\frac{\langle \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha \rangle}{\langle \Phi_\alpha \rangle} = \mu^{2\nu^{-1}(\sum_{a \in J^+} a + \sum_{b \in J^+} b)}$$

$$\times \prod_{a \in J^+} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(a + \nu\alpha) \prod_{b \in J^-} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(b - \nu\alpha) .$$

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R = \infty$.

- For $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$ we have

$$\frac{\langle \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha \rangle}{\langle \Phi_\alpha \rangle} = \mu^{2\nu^{-1}(\sum_{a \in J^+} a + \sum_{b \in J^+} b)}$$

$$\times \prod_{a \in J^+} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(a + \nu\alpha) \prod_{b \in J^-} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(b - \nu\alpha) .$$

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R=\infty$.

- For $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$ we have

$$\frac{\langle \beta^*_{J^+}\gamma^*_{J^-}\bar{\beta}^*_{\bar{J}^+}\bar{\gamma}^*_{\bar{J}^-}\Phi_\alpha\rangle}{\langle\Phi_\alpha\rangle} = \mu^{2\nu^{-1}(\sum_{a\in J^+} a+\sum_{b\in J^+} b)}$$

$$\times \prod_{a\in J^+}\frac{i}{\nu}\cot\frac{\pi}{2\nu}(a+\nu\alpha)\prod_{b\in J^-}\frac{i}{\nu}\cot\frac{\pi}{2\nu}(b-\nu\alpha)\,.$$

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R = \infty$.

- For $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$ we have

$$\frac{\langle \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha \rangle}{\langle \Phi_\alpha \rangle} = \mu^{2\nu^{-1}(\sum_{a \in J^+} a + \sum_{b \in \bar{J}^+} b)}$$

$$\times \prod_{a \in J^+} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(a + \nu\alpha) \prod_{b \in J^-} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(b - \nu\alpha) .$$

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R = \infty$.

- For $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$ we have

$$\frac{\langle \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha \rangle}{\langle \Phi_\alpha \rangle} = \boldsymbol{\mu}^{2\nu^{-1}(\sum_{a\in J^+} a + \sum_{b \in J^+} b)}$$

$$\times \prod_{a \in J^+} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(a + \nu\alpha) \prod_{b \in J^-} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(b - \nu\alpha) \,.$$

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R = \infty$.

- For $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$ we have

$$\frac{\langle \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha \rangle}{\langle \Phi_\alpha \rangle} = \mu^{2\nu^{-1}(\sum_{a\in J^+} a + \sum_{b \in \bar{J}^+} b)}$$

$$\times \prod_{a\in J^+} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(a + \nu\alpha) \prod_{b \in J^-} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(b - \nu\alpha) .$$

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R = \infty$.

- For $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$ we have

$$\frac{\langle \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha \rangle}{\langle \Phi_\alpha \rangle} = \mu^{2\nu^{-1}(\sum_{a \in J^+} a + \sum_{b \in J^+} b)}$$

$$\times \prod_{a \in J^+} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(a + \nu\alpha) \prod_{b \in J^-} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(b - \nu\alpha) .$$

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R = \infty$.

- For $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$ we have

$$\frac{\langle \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha \rangle}{\langle \Phi_\alpha \rangle} = \mu^{2\nu^{-1}(\sum_{a \in J^+} a + \sum_{b \in J^+} b)}$$

$$\times \prod_{a \in J^+} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(a + \nu\alpha) \prod_{b \in J^-} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(b - \nu\alpha) .$$

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R=\infty$.

- For $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$ we have

$$\frac{\langle \beta^*_{J^+}\gamma^*_{J^-}\bar{\beta}^*_{\bar{J}^+}\bar{\gamma}^*_{\bar{J}^-}\Phi_\alpha\rangle}{\langle\Phi_\alpha\rangle} = \mu^{2\nu^{-1}(\sum_{a\in J^+} a + \sum_{b\in J^+} b)}$$

$$\times \prod_{a\in J^+} \frac{i}{\nu}\cot\frac{\pi}{2\nu}(a+\nu\alpha) \prod_{b\in J^-} \frac{i}{\nu}\cot\frac{\pi}{2\nu}(b-\nu\alpha) .$$

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R = \infty$.

- For $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$ we have

$$\frac{\langle \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha \rangle}{\langle \Phi_\alpha \rangle} = \mu^{2\nu^{-1}(\sum_{a\in J^+} a + \sum_{b \in J^+} b)}$$

$$\times \prod_{a\in J^+} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(a + \nu\alpha) \prod_{b \in J^-} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(b - \nu\alpha) .$$

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R = \infty$.

- For $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$ we have

$$\frac{\langle \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha \rangle}{\langle \Phi_\alpha \rangle} = \mu^{2\nu^{-1}(\sum_{a \in J^+} a + \sum_{b \in \bar{J}^+} b)}$$

$$\times \prod_{a \in J^+} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(a + \nu\alpha) \prod_{b \in J^-} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(b - \nu\alpha) .$$

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R = \infty$.

- For $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$ we have

$$\frac{\langle \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha \rangle}{\langle \Phi_\alpha \rangle} = \mu^{2\nu^{-1}(\sum_{a \in J^+} a + \sum_{b \in J^+} b)}$$

$$\times \prod_{a \in J^+} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(a + \nu\alpha) \prod_{b \in J^-} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(b - \nu\alpha) .$$

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R = \infty$.

- For $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$ we have

$$\frac{\langle \beta^*_{J^+}\gamma^*_{J^-}\bar{\beta}^*_{\bar{J}^+}\bar{\gamma}^*_{\bar{J}^-}\Phi_\alpha\rangle}{\langle \Phi_\alpha\rangle} = \mu^{2\nu^{-1}(\sum_{a\in J^+} a + \sum_{b\in J^+} b)}$$

$$\times \prod_{a\in J^+} \frac{i}{\nu}\cot\frac{\pi}{2\nu}(a+\nu\alpha) \prod_{b\in J^-} \frac{i}{\nu}\cot\frac{\pi}{2\nu}(b-\nu\alpha)\,.$$

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R = \infty$.

- For $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$ we have

$$\frac{\langle \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha \rangle}{\langle \Phi_\alpha \rangle} = \mu^{2\nu^{-1}(\sum_{a \in J^+} a + \sum_{b \in J^+} b)}$$

$$\times \prod_{a \in J^+} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(a + \nu\alpha) \prod_{b \in J^-} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(b - \nu\alpha) .$$

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R = \infty$.

- For $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$ we have

$$\frac{\langle \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha \rangle}{\langle \Phi_\alpha \rangle} = \mu^{2\nu^{-1}(\sum_{a\in J^+} a + \sum_{b\in J^+} b)}$$

$$\times \prod_{a\in J^+} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(a + \nu\alpha) \prod_{b\in J^-} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(b - \nu\alpha)\,.$$

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R = \infty$.

- For $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$ we have

$$\frac{\langle \beta^*_{J^+}\gamma^*_{J^-}\bar{\beta}^*_{\bar{J}^+}\bar{\gamma}^*_{\bar{J}^-}\Phi_\alpha\rangle}{\langle \Phi_\alpha \rangle} = \mu^{2\nu^{-1}(\sum_{a\in J^+} a + \sum_{b\in J^+} b)}$$

$$\times \prod_{a\in J^+} \frac{i}{\nu}\cot\frac{\pi}{2\nu}(a+\nu\alpha) \prod_{b\in J^-} \frac{i}{\nu}\cot\frac{\pi}{2\nu}(b-\nu\alpha)\,.$$

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R = \infty$.

- For $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$ we have

$$\frac{\langle \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha \rangle}{\langle \Phi_\alpha \rangle} = \mu^{2\nu^{-1}(\sum_{a \in J^+} a + \sum_{b \in J^+} b)}$$

$$\times \prod_{a \in J^+} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(a + \nu\alpha) \prod_{b \in J^-} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(b - \nu\alpha) .$$

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R = \infty$.

- For $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$ we have

$$\frac{\langle \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha \rangle}{\langle \Phi_\alpha \rangle} = \mu^{2\nu^{-1}(\sum_{a \in J^+} a + \sum_{b \in J^+} b)}$$

$$\times \prod_{a \in J^+} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(a + \nu\alpha) \prod_{b \in J^-} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(b - \nu\alpha) \,.$$

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R = \infty$.

- For $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$ we have

$$\frac{\langle \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha \rangle}{\langle \Phi_\alpha \rangle} = \mu^{2\nu^{-1}(\sum_{a\in J^+} a + \sum_{b \in J^+} b)}$$

$$\times \prod_{a\in J^+} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(a + \nu\alpha) \prod_{b \in J^-} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(b - \nu\alpha) \, .$$

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R = \infty$.

- For $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$ we have

$$\frac{\langle \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha \rangle}{\langle \Phi_\alpha \rangle} = \mu^{2\nu^{-1}(\sum_{a\in J^+} a + \sum_{b\in J^+} b)}$$

$$\times \prod_{a\in J^+} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(a + \nu\alpha) \prod_{b\in J^-} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(b - \nu\alpha) .$$

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R=\infty$.

- For $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$ we have

$$\frac{\langle \beta^*_{J^+}\gamma^*_{J^-}\bar{\beta}^*_{\bar{J}^+}\bar{\gamma}^*_{\bar{J}^-}\Phi_\alpha\rangle}{\langle\Phi_\alpha\rangle} = \mu^{2\nu^{-1}(\sum_{a\in J^+} a+\sum_{b\in J^+} b)}$$

$$\times \prod_{a\in J^+}\frac{i}{\nu}\cot\frac{\pi}{2\nu}(a+\nu\alpha)\prod_{b\in J^-}\frac{i}{\nu}\cot\frac{\pi}{2\nu}(b-\nu\alpha)\,.$$

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R = \infty$.

- For $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$ we have

$$\frac{\langle \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha \rangle}{\langle \Phi_\alpha \rangle} = \mu^{2\nu^{-1}(\sum_{a \in J^+} a + \sum_{b \in J^+} b)}$$
$$\times \prod_{a \in J^+} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(a + \nu\alpha) \prod_{b \in J^-} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(b - \nu\alpha).$$

- Under the shift $\alpha \to \alpha + 2(1-\nu)/\nu$:

$$\langle \Phi_{\alpha + 2\frac{1-\nu}{\nu}} \rangle = \langle \Phi_\alpha \rangle \tilde{C}_{1,0}(\alpha) \mu^{2/\nu - 2(2-\alpha)}$$
$$\times \frac{1}{\nu} \cot \frac{\pi}{2\nu}(1 + \nu\alpha) \tan \frac{\pi\nu}{2}(2 - \alpha).$$

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R = \infty$.

- For $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$ we have

$$\frac{\langle \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha \rangle}{\langle \Phi_\alpha \rangle} = \mu^{2\nu^{-1}(\sum_{a \in J^+} a + \sum_{b \in J^+} b)}$$

$$\times \prod_{a \in J^+} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(a + \nu\alpha) \prod_{b \in J^-} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(b - \nu\alpha) .$$

- Under the shift $\alpha \to \alpha + 2(1-\nu)/\nu$:

$$\langle \Phi_{\alpha + 2\frac{1-\nu}{\nu}} \rangle = \langle \Phi_\alpha \rangle \tilde{C}_{1,0}(\alpha) \mu^{2/\nu - 2(2-\alpha)}$$

$$\times \frac{1}{\nu} \cot \frac{\pi}{2\nu}(1 + \nu\alpha) \tan \frac{\pi\nu}{2}(2 - \alpha) .$$

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R=\infty$.

- For $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$ we have

$$\frac{\langle \beta^*_{J^+}\gamma^*_{J^-}\bar{\beta}^*_{\bar{J}^+}\bar{\gamma}^*_{\bar{J}^-}\Phi_\alpha\rangle}{\langle\Phi_\alpha\rangle} = \mu^{2\nu^{-1}(\sum_{a\in J^+} a + \sum_{b\in J^+} b)}$$

$$\times \prod_{a\in J^+} \frac{i}{\nu}\cot\frac{\pi}{2\nu}(a+\nu\alpha) \prod_{b\in J^-} \frac{i}{\nu}\cot\frac{\pi}{2\nu}(b-\nu\alpha)\,.$$

- Under the shift $\alpha \to \alpha + 2(1-\nu)/\nu$:

$$\langle \Phi_{\alpha+2\frac{1-\nu}{\nu}}\rangle = \langle\Phi_\alpha\rangle \tilde{C}_{1,0}(\alpha)\mu^{2/\nu-2(2-\alpha)}$$

$$\times \frac{1}{\nu}\cot\frac{\pi}{2\nu}(1+\nu\alpha)\tan\frac{\pi\nu}{2}(2-\alpha)\,.$$

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R = \infty$.

- For $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$ we have

$$\frac{\langle \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha \rangle}{\langle \Phi_\alpha \rangle} = \boldsymbol{\mu}^{2\nu^{-1}(\sum_{a\in J^+} a + \sum_{b\in J^+} b)}$$

$$\times \prod_{a\in J^+} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(a + \nu\alpha) \prod_{b\in J^-} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(b - \nu\alpha) .$$

- Under the shift $\alpha \to \alpha + 2(1-\nu)/\nu$:

$$\langle \Phi_{\alpha + 2\frac{1-\nu}{\nu}} \rangle = \langle \Phi_\alpha \rangle \tilde{C}_{1,0}(\alpha) \boldsymbol{\mu}^{2/\nu - 2(2-\alpha)}$$

$$\times \frac{1}{\nu} \cot \frac{\pi}{2\nu}(1 + \nu\alpha) \tan \frac{\pi\nu}{2}(2 - \alpha) .$$

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R = \infty$.

- For $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$ we have

$$\frac{\langle \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha \rangle}{\langle \Phi_\alpha \rangle} = \mu^{2\nu^{-1}(\sum_{a\in J^+} a + \sum_{b\in J^+} b)}$$

$$\times \prod_{a\in J^+} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(a + \nu\alpha) \prod_{b\in J^-} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(b - \nu\alpha) .$$

- Under the shift $\alpha \to \alpha + 2(1-\nu)/\nu$:

$$\langle \Phi_{\alpha+2\frac{1-\nu}{\nu}} \rangle = \langle \Phi_\alpha \rangle \tilde{C}_{1,0}(\alpha) \mu^{2/\nu - 2(2-\alpha)}$$

$$\times \frac{1}{\nu} \cot \frac{\pi}{2\nu}(1 + \nu\alpha) \tan \frac{\pi\nu}{2}(2 - \alpha) .$$

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R = \infty$.

- For $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$ we have

$$\frac{\langle \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha \rangle}{\langle \Phi_\alpha \rangle} = \mu^{2\nu^{-1}(\sum_{a \in J^+} a + \sum_{b \in J^+} b)}$$

$$\times \prod_{a \in J^+} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(a + \nu\alpha) \prod_{b \in J^-} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(b - \nu\alpha) .$$

- Under the shift $\alpha \to \alpha + 2(1-\nu)/\nu$:

$$\langle \Phi_{\alpha + 2\frac{1-\nu}{\nu}} \rangle = \langle \Phi_\alpha \rangle \tilde{C}_{1,0}(\alpha) \mu^{2/\nu - 2(2-\alpha)}$$

$$\times \frac{1}{\nu} \cot \frac{\pi}{2\nu}(1 + \nu\alpha) \tan \frac{\pi\nu}{2}(2 - \alpha) .$$

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R = \infty$.

- For $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$ we have

$$\frac{\langle \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha \rangle}{\langle \Phi_\alpha \rangle} = \boldsymbol{\mu}^{2\nu^{-1}(\sum_{a \in J^+} a + \sum_{b \in J^+} b)}$$

$$\times \prod_{a \in J^+} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(a + \nu\alpha) \prod_{b \in J^-} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(b - \nu\alpha) .$$

- Under the shift $\alpha \to \alpha + 2(1-\nu)/\nu$:

$$\langle \Phi_{\alpha + 2\frac{1-\nu}{\nu}} \rangle = \langle \Phi_\alpha \rangle \tilde{C}_{1,0}(\alpha) \boldsymbol{\mu}^{2/\nu - 2(2-\alpha)}$$

$$\times \frac{1}{\nu} \cot \frac{\pi}{2\nu}(1 + \nu\alpha) \tan \frac{\pi\nu}{2}(2 - \alpha) .$$

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R = \infty$.

- For $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$ we have

$$\frac{\langle \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha \rangle}{\langle \Phi_\alpha \rangle} = \mu^{2\nu^{-1}(\sum_{a\in J^+} a + \sum_{b\in J^+} b)}$$

$$\times \prod_{a\in J^+} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(a+\nu\alpha) \prod_{b\in J^-} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(b-\nu\alpha)\,.$$

- Under the shift $\alpha \to \alpha + 2(1-\nu)/\nu$:

$$\langle \Phi_{\alpha+2\frac{1-\nu}{\nu}} \rangle = \langle \Phi_\alpha \rangle \tilde{C}_{1,0}(\alpha) \mu^{2/\nu - 2(2-\alpha)}$$

$$\times \frac{1}{\nu} \cot \frac{\pi}{2\nu}(1+\nu\alpha) \tan \frac{\pi\nu}{2}(2-\alpha)\,.$$

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R=\infty$.

- For $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$ we have

$$\frac{\langle \beta^*_{J^+}\gamma^*_{J^-}\bar{\beta}^*_{\bar{J}^+}\bar{\gamma}^*_{\bar{J}^-}\Phi_\alpha\rangle}{\langle\Phi_\alpha\rangle} = \boldsymbol{\mu}^{2\nu^{-1}(\sum_{a\in J^+}a+\sum_{b\in J^+}b)}$$

$$\times \prod_{a\in J^+}\frac{i}{\nu}\cot\frac{\pi}{2\nu}(a+\nu\alpha)\prod_{b\in J^-}\frac{i}{\nu}\cot\frac{\pi}{2\nu}(b-\nu\alpha)\,.$$

- Under the shift $\alpha\to\alpha+2(1-\nu)/\nu$:

$$\langle\Phi_{\alpha+2\frac{1-\nu}{\nu}}\rangle = \langle\Phi_\alpha\rangle\tilde{C}_{1,0}(\alpha)\boldsymbol{\mu}^{2/\nu-2(2-\alpha)}$$

$$\times\frac{1}{\nu}\cot\frac{\pi}{2\nu}(1+\nu\alpha)\tan\frac{\pi\nu}{2}(2-\alpha)\,.$$

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R = \infty$.

- For $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$ we have

$$\frac{\langle \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha \rangle}{\langle \Phi_\alpha \rangle} = \mu^{2\nu^{-1}(\sum_{a \in J^+} a + \sum_{b \in \bar{J}^+} b)}$$

$$\times \prod_{a \in J^+} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(a + \nu\alpha) \prod_{b \in J^-} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(b - \nu\alpha) .$$

- Under the shift $\alpha \to \alpha + 2(1-\nu)/\nu$:

$$\langle \Phi_{\alpha + 2\frac{1-\nu}{\nu}} \rangle = \langle \Phi_\alpha \rangle \tilde{C}_{1,0}(\alpha) \mu^{2/\nu - 2(2-\alpha)}$$

$$\times \frac{1}{\nu} \cot \frac{\pi}{2\nu}(1 + \nu\alpha) \tan \frac{\pi\nu}{2}(2 - \alpha) .$$

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R = \infty$.

- For $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$ we have

$$\frac{\langle \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha \rangle}{\langle \Phi_\alpha \rangle} = \boldsymbol{\mu}^{2\nu^{-1}(\sum_{a\in J^+} a + \sum_{b \in J^+} b)}$$

$$\times \prod_{a\in J^+} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(a + \nu\alpha) \prod_{b \in J^-} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(b - \nu\alpha) .$$

- Under the shift $\alpha \to \alpha + 2(1-\nu)/\nu$:

$$\langle \Phi_{\alpha + 2\frac{1-\nu}{\nu}} \rangle = \langle \Phi_\alpha \rangle \tilde{C}_{1,0}(\alpha) \boldsymbol{\mu}^{2/\nu - 2(2-\alpha)}$$

$$\times \frac{1}{\nu} \cot \frac{\pi}{2\nu}(1 + \nu\alpha) \tan \frac{\pi\nu}{2}(2 - \alpha) .$$

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R = \infty$.

- For $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$ we have

$$\frac{\langle \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha \rangle}{\langle \Phi_\alpha \rangle} = \mu^{2\nu^{-1}(\sum_{a \in J^+} a + \sum_{b \in \bar{J}^+} b)}$$

$$\times \prod_{a \in J^+} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(a + \nu\alpha) \prod_{b \in J^-} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(b - \nu\alpha) .$$

- Under the shift $\alpha \to \alpha + 2(1-\nu)/\nu$:

$$\langle \Phi_{\alpha + 2\frac{1-\nu}{\nu}} \rangle = \langle \Phi_\alpha \rangle \tilde{C}_{1,0}(\alpha) \mu^{2/\nu - 2(2-\alpha)}$$

$$\times \frac{1}{\nu} \cot \frac{\pi}{2\nu}(1 + \nu\alpha) \tan \frac{\pi\nu}{2}(2 - \alpha) .$$

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R=\infty$.

- For $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$ we have

$$\frac{\langle \beta^*_{J^+}\gamma^*_{J^-}\bar{\beta}^*_{\bar{J}^+}\bar{\gamma}^*_{\bar{J}^-}\Phi_\alpha\rangle}{\langle\Phi_\alpha\rangle} = \boldsymbol{\mu}^{2\nu^{-1}(\sum_{a\in J^+} a+\sum_{b\in J^+} b)}$$

$$\times \prod_{a\in J^+}\frac{i}{\nu}\cot\frac{\pi}{2\nu}(a+\nu\alpha)\prod_{b\in J^-}\frac{i}{\nu}\cot\frac{\pi}{2\nu}(b-\nu\alpha)\,.$$

- Under the shift $\alpha\to\alpha+2(1-\nu)/\nu$:

$$\langle\Phi_{\alpha+2\frac{1-\nu}{\nu}}\rangle = \langle\Phi_\alpha\rangle\,\tilde{C}_{1,0}(\alpha)\boldsymbol{\mu}^{2/\nu-2(2-\alpha)}$$

$$\times\frac{1}{\nu}\cot\frac{\pi}{2\nu}(1+\nu\alpha)\tan\frac{\pi\nu}{2}(2-\alpha)\,.$$

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R = \infty$.

- For $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$ we have

$$\frac{\langle \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha \rangle}{\langle \Phi_\alpha \rangle} = \mu^{2\nu^{-1}(\sum_{a \in J^+} a + \sum_{b \in J^+} b)}$$

$$\times \prod_{a \in J^+} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(a + \nu\alpha) \prod_{b \in J^-} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(b - \nu\alpha) .$$

- Under the shift $\alpha \to \alpha + 2(1-\nu)/\nu$:

$$\langle \Phi_{\alpha + 2\frac{1-\nu}{\nu}} \rangle = \langle \Phi_\alpha \rangle \tilde{C}_{1,0}(\alpha) \mu^{2/\nu - 2(2-\alpha)}$$

$$\times \frac{1}{\nu} \cot \frac{\pi}{2\nu}(1 + \nu\alpha) \tan \frac{\pi\nu}{2}(2 - \alpha) .$$

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R = \infty$.

- For $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$ we have

$$\frac{\langle \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha \rangle}{\langle \Phi_\alpha \rangle} = \mu^{2\nu^{-1}(\sum_{a \in J^+} a + \sum_{b \in J^+} b)}$$

$$\times \prod_{a \in J^+} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(a + \nu\alpha) \prod_{b \in J^-} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(b - \nu\alpha) .$$

- Under the shift $\alpha \to \alpha + 2(1-\nu)/\nu$:

$$\langle \Phi_{\alpha + 2\frac{1-\nu}{\nu}} \rangle = \langle \Phi_\alpha \rangle \tilde{C}_{1,0}(\alpha) \mu^{2/\nu - 2(2-\alpha)}$$

$$\times \frac{1}{\nu} \cot \frac{\pi}{2\nu}(1 + \nu\alpha) \tan \frac{\pi\nu}{2}(2 - \alpha) .$$

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R = \infty$.

- For $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$ we have

$$\frac{\langle \beta^*_{J^+}\gamma^*_{J^-}\bar{\beta}^*_{\bar{J}^+}\bar{\gamma}^*_{\bar{J}^-}\Phi_\alpha\rangle}{\langle\Phi_\alpha\rangle} = \mu^{2\nu^{-1}(\sum_{a\in J^+} a + \sum_{b\in J^+} b)}$$

$$\times \prod_{a\in J^+} \frac{i}{\nu}\cot\frac{\pi}{2\nu}(a+\nu\alpha) \prod_{b\in J^-} \frac{i}{\nu}\cot\frac{\pi}{2\nu}(b-\nu\alpha).$$

- Under the shift $\alpha \to \alpha + 2(1-\nu)/\nu$:

$$\langle\Phi_{\alpha+2\frac{1-\nu}{\nu}}\rangle = \langle\Phi_\alpha\rangle \tilde{C}_{1,0}(\alpha)\mu^{2/\nu-2(2-\alpha)}$$

$$\times \frac{1}{\nu}\cot\frac{\pi}{2\nu}(1+\nu\alpha)\tan\frac{\pi\nu}{2}(2-\alpha).$$

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R = \infty$.

- For $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$ we have

$$\frac{\langle \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha \rangle}{\langle \Phi_\alpha \rangle} = \boldsymbol{\mu}^{2\nu^{-1}(\sum_{a \in J^+} a + \sum_{b \in J^+} b)}$$

$$\times \prod_{a \in J^+} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(a + \nu\alpha) \prod_{b \in J^-} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(b - \nu\alpha) \,.$$

- Under the shift $\alpha \to \alpha + 2(1-\nu)/\nu$:

$$\langle \Phi_{\alpha + 2\frac{1-\nu}{\nu}} \rangle = \langle \Phi_\alpha \rangle \tilde{C}_{1,0}(\alpha) \boldsymbol{\mu}^{2/\nu - 2(2-\alpha)}$$

$$\times \frac{1}{\nu} \cot \frac{\pi}{2\nu}(1 + \nu\alpha) \tan \frac{\pi\nu}{2}(2 - \alpha) \,.$$

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R = \infty$.

- For $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$ we have

$$\frac{\langle \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha \rangle}{\langle \Phi_\alpha \rangle} = \mu^{2\nu^{-1}(\sum_{a\in J^+} a + \sum_{b\in J^+} b)}$$

$$\times \prod_{a\in J^+} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(a + \nu\alpha) \prod_{b\in J^-} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(b - \nu\alpha) .$$

- Under the shift $\alpha \to \alpha + 2(1-\nu)/\nu$:

$$\langle \Phi_{\alpha+2\frac{1-\nu}{\nu}} \rangle = \langle \Phi_\alpha \rangle \tilde{C}_{1,0}(\alpha) \mu^{2/\nu - 2(2-\alpha)}$$

$$\times \frac{1}{\nu} \cot \frac{\pi}{2\nu}(1 + \nu\alpha) \tan \frac{\pi\nu}{2}(2 - \alpha) .$$

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R = \infty$.

- For $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$ we have

$$\frac{\langle \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha \rangle}{\langle \Phi_\alpha \rangle} = \boldsymbol{\mu}^{2\nu^{-1}(\sum_{a\in J^+} a + \sum_{b \in J^+} b)}$$

$$\times \prod_{a \in J^+} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(a + \nu\alpha) \prod_{b \in J^-} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(b - \nu\alpha) .$$

- Under the shift $\alpha \to \alpha + 2(1-\nu)/\nu$:

$$\langle \Phi_{\alpha + 2\frac{1-\nu}{\nu}} \rangle = \langle \Phi_\alpha \rangle \tilde{C}_{1,0}(\alpha) \boldsymbol{\mu}^{2/\nu - 2(2-\alpha)}$$

$$\times \frac{1}{\nu} \cot \frac{\pi}{2\nu}(1 + \nu\alpha) \tan \frac{\pi\nu}{2}(2 - \alpha) .$$

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R = \infty$.

- For $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$ we have

$$\frac{\langle \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha \rangle}{\langle \Phi_\alpha \rangle} = \mu^{2\nu^{-1}(\sum_{a \in J^+} a + \sum_{b \in J^+} b)}$$

$$\times \prod_{a \in J^+} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(a + \nu\alpha) \prod_{b \in J^-} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(b - \nu\alpha) .$$

- Under the shift $\alpha \to \alpha + 2(1-\nu)/\nu$:

$$\langle \Phi_{\alpha + 2\frac{1-\nu}{\nu}} \rangle = \langle \Phi_\alpha \rangle \tilde{C}_{1,0}(\alpha) \mu^{2/\nu - 2(2-\alpha)}$$

$$\times \frac{1}{\nu} \cot \frac{\pi}{2\nu}(1 + \nu\alpha) \tan \frac{\pi\nu}{2}(2 - \alpha) .$$

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R=\infty$.

- For $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$ we have

$$\frac{\langle \beta^*_{J^+}\gamma^*_{J^-}\bar{\beta}^*_{\bar{J}^+}\bar{\gamma}^*_{\bar{J}^-}\Phi_\alpha\rangle}{\langle\Phi_\alpha\rangle} = \boldsymbol{\mu}^{2\nu^{-1}(\sum_{a\in J^+} a + \sum_{b\in J^+} b)}$$

$$\times \prod_{a\in J^+}\frac{i}{\nu}\cot\frac{\pi}{2\nu}(a+\nu\alpha)\prod_{b\in J^-}\frac{i}{\nu}\cot\frac{\pi}{2\nu}(b-\nu\alpha)\,.$$

- Under the shift $\alpha\to\alpha+2(1-\nu)/\nu$:

$$\langle\Phi_{\alpha+2\frac{1-\nu}{\nu}}\rangle = \langle\Phi_\alpha\rangle\tilde{C}_{1,0}(\alpha)\boldsymbol{\mu}^{2/\nu-2(2-\alpha)}$$

$$\times\frac{1}{\nu}\cot\frac{\pi}{2\nu}(1+\nu\alpha)\tan\frac{\pi\nu}{2}(2-\alpha)\,.$$

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R = \infty$.

- For $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$ we have

$$\frac{\langle \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha \rangle}{\langle \Phi_\alpha \rangle} = \mu^{2\nu^{-1}(\sum_{a\in J^+} a + \sum_{b \in \bar{J}^+} b)}$$

$$\times \prod_{a\in J^+} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(a + \nu\alpha) \prod_{b \in J^-} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(b - \nu\alpha) .$$

- Under the shift $\alpha \to \alpha + 2(1-\nu)/\nu$:

$$\langle \Phi_{\alpha + 2\frac{1-\nu}{\nu}} \rangle = \langle \Phi_\alpha \rangle \tilde{C}_{1,0}(\alpha) \mu^{2/\nu - 2(2-\alpha)}$$

$$\times \frac{1}{\nu} \cot \frac{\pi}{2\nu}(1 + \nu\alpha) \tan \frac{\pi\nu}{2}(2 - \alpha) .$$

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R = \infty$.

- For $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$ we have

$$\frac{\langle \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha \rangle}{\langle \Phi_\alpha \rangle} = \boldsymbol{\mu}^{2\nu^{-1}(\sum_{a \in J^+} a + \sum_{b \in J^+} b)}$$

$$\times \prod_{a \in J^+} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(a + \nu\alpha) \prod_{b \in J^-} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(b - \nu\alpha) .$$

- Under the shift $\alpha \to \alpha + 2(1-\nu)/\nu$:

$$\langle \Phi_{\alpha + 2\frac{1-\nu}{\nu}} \rangle = \langle \Phi_\alpha \rangle \tilde{C}_{1,0}(\alpha) \boldsymbol{\mu}^{2/\nu - 2(2-\alpha)}$$

$$\times \frac{1}{\nu} \cot \frac{\pi}{2\nu}(1 + \nu\alpha) \tan \frac{\pi\nu}{2}(2 - \alpha) .$$

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R = \infty$.

- For $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$ we have

$$\frac{\langle \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha \rangle}{\langle \Phi_\alpha \rangle} = \boldsymbol{\mu}^{2\nu^{-1}(\sum_{a\in J^+} a + \sum_{b \in J^+} b)}$$

$$\times \prod_{a \in J^+} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(a + \nu\alpha) \prod_{b \in J^-} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(b - \nu\alpha) \, .$$

- Under the shift $\alpha \to \alpha + 2(1-\nu)/\nu$:

$$\langle \Phi_{\alpha + 2\frac{1-\nu}{\nu}} \rangle = \langle \Phi_\alpha \rangle \tilde{C}_{1,0}(\alpha) \boldsymbol{\mu}^{2/\nu - 2(2-\alpha)}$$

$$\times \frac{1}{\nu} \cot \frac{\pi}{2\nu}(1 + \nu\alpha) \tan \frac{\pi\nu}{2}(2 - \alpha) \, .$$

Checks

We have performed various checks against known results.

Checks

We have performed various checks against known results.

- Self-consistency

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R = \infty$.

- For $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$ we have

$$\frac{\langle \beta^*_{J^+}\gamma^*_{J^-}\bar{\beta}^*_{\bar{J}^+}\bar{\gamma}^*_{\bar{J}^-}\Phi_\alpha\rangle}{\langle\Phi_\alpha\rangle} = \mu^{2\nu^{-1}(\sum_{a\in J^+} a + \sum_{b\in J^+} b)}$$

$$\times \prod_{a\in J^+} \frac{i}{\nu} \cot\frac{\pi}{2\nu}(a+\nu\alpha) \prod_{b\in J^-} \frac{i}{\nu} \cot\frac{\pi}{2\nu}(b-\nu\alpha)\,.$$

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R = \infty$.

- For $\sharp J^{+} = \sharp J^{-}$, $\sharp \bar{J}^{+} = \sharp \bar{J}^{-}$ we have

$$\frac{\langle \beta^{*}_{J^+} \gamma^{*}_{J^-} \bar{\beta}^{*}_{\bar{J}^+} \bar{\gamma}^{*}_{\bar{J}^-} \Phi_\alpha \rangle}{\langle \Phi_\alpha \rangle} = \mu^{2\nu^{-1}(\sum_{a \in J^+} a + \sum_{b \in \bar{J}^+} b)}$$

$$\times \prod_{a \in J^+} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(a + \nu\alpha) \prod_{b \in J^-} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(b - \nu\alpha) \,.$$

- Under the shift $\alpha \to \alpha + 2(1-\nu)/\nu$:

$$\langle \Phi_{\alpha + 2\frac{1-\nu}{\nu}} \rangle = \langle \Phi_\alpha \rangle \tilde{C}_{1,0}(\alpha) \mu^{2/\nu - 2(2-\alpha)}$$

$$\times \frac{1}{\nu} \cot \frac{\pi}{2\nu}(1 + \nu\alpha) \tan \frac{\pi\nu}{2}(2 - \alpha) \,.$$

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R=\infty$.

- For $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$ we have

$$\frac{\langle \beta^*_{J^+}\gamma^*_{J^-}\bar{\beta}^*_{\bar{J}^+}\bar{\gamma}^*_{\bar{J}^-}\Phi_\alpha\rangle}{\langle\Phi_\alpha\rangle} = \mu^{2\nu^{-1}(\sum_{a\in J^+}a+\sum_{b\in J^+}b)}$$

$$\times \prod_{a\in J^+}\frac{i}{\nu}\cot\frac{\pi}{2\nu}(a+\nu\alpha)\prod_{b\in J^-}\frac{i}{\nu}\cot\frac{\pi}{2\nu}(b-\nu\alpha)\,.$$

- Under the shift $\alpha\to\alpha+2(1-\nu)/\nu$:

$$\langle\Phi_{\alpha+2\frac{1-\nu}{\nu}}\rangle = \langle\Phi_\alpha\rangle\,\tilde{C}_{1,0}(\alpha)\mu^{2/\nu-2(2-\alpha)}$$

$$\times\frac{1}{\nu}\cot\frac{\pi}{2\nu}(1+\nu\alpha)\tan\frac{\pi\nu}{2}(2-\alpha)\,.$$

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R = \infty$.

- For $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$ we have

$$\frac{\langle \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha \rangle}{\langle \Phi_\alpha \rangle} = \mu^{2\nu^{-1}(\sum_{a \in J^+} a + \sum_{b \in J^+} b)}$$

$$\times \prod_{a \in J^+} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(a + \nu\alpha) \prod_{b \in J^-} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(b - \nu\alpha) .$$

- Under the shift $\alpha \to \alpha + 2(1-\nu)/\nu$:

$$\langle \Phi_{\alpha + 2\frac{1-\nu}{\nu}} \rangle = \langle \Phi_\alpha \rangle \tilde{C}_{1,0}(\alpha) \mu^{2/\nu - 2(2-\alpha)}$$

$$\times \frac{1}{\nu} \cot \frac{\pi}{2\nu}(1 + \nu\alpha) \tan \frac{\pi\nu}{2}(2 - \alpha) .$$

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R = \infty$.

- For $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$ we have

$$\frac{\langle \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha \rangle}{\langle \Phi_\alpha \rangle} = \mu^{2\nu^{-1}(\sum_{a \in J^+} a + \sum_{b \in J^+} b)}$$

$$\times \prod_{a \in J^+} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(a + \nu\alpha) \prod_{b \in J^-} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(b - \nu\alpha).$$

- Under the shift $\alpha \to \alpha + 2(1-\nu)/\nu$:

$$\langle \Phi_{\alpha + 2\frac{1-\nu}{\nu}} \rangle = \langle \Phi_\alpha \rangle \tilde{C}_{1,0}(\alpha) \mu^{2/\nu - 2(2-\alpha)}$$

$$\times \frac{1}{\nu} \cot \frac{\pi}{2\nu}(1 + \nu\alpha) \tan \frac{\pi\nu}{2}(2 - \alpha).$$

Conjecture(sine-Gordon model)

For simplicity, we consider VEV in the case $R = \infty$.

- For $\sharp J^+ = \sharp J^-$, $\sharp \bar{J}^+ = \sharp \bar{J}^-$ we have

$$\frac{\langle \beta^*_{J^+} \gamma^*_{J^-} \bar{\beta}^*_{\bar{J}^+} \bar{\gamma}^*_{\bar{J}^-} \Phi_\alpha \rangle}{\langle \Phi_\alpha \rangle} = \boldsymbol{\mu}^{2\nu^{-1}(\sum_{a\in J^+} a + \sum_{b\in \bar{J}^+} b)}$$

$$\times \prod_{a\in J^+} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(a + \nu\alpha) \prod_{b\in J^-} \frac{i}{\nu} \cot \frac{\pi}{2\nu}(b - \nu\alpha) .$$

- Under the shift $\alpha \to \alpha + 2(1-\nu)/\nu$:

$$\langle \Phi_{\alpha + 2\frac{1-\nu}{\nu}} \rangle = \langle \Phi_\alpha \rangle \tilde{C}_{1,0}(\alpha) \boldsymbol{\mu}^{2/\nu - 2(2-\alpha)}$$

$$\times \frac{1}{\nu} \cot \frac{\pi}{2\nu}(1 + \nu\alpha) \tan \frac{\pi\nu}{2}(2 - \alpha) .$$

Checks

We have performed various checks against known results.

- Self-consistency

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)
- Formula for $\langle \ell_{-2}\bar{\ell}_{-2}\Phi_\alpha \rangle$ (Fateev et al., 1997)

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)
- Formula for $\langle \ell_{-2}\bar{\ell}_{-2}\Phi_\alpha \rangle$ (Fateev et al., 1997)

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)
- Formula for $\langle \ell_{-2} \bar{\ell}_{-2} \Phi_\alpha \rangle$ (Fateev et al., 1997)

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)
- Formula for $\langle \ell_{-2} \bar{\ell}_{-2} \Phi_\alpha \rangle$ (Fateev et al., 1997)

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)
- Formula for $\langle \ell_{-2}\bar{\ell}_{-2}\Phi_\alpha \rangle$ (Fateev et al., 1997)

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)
- Formula for $\langle \ell_{-2}\bar{\ell}_{-2}\Phi_\alpha \rangle$ (Fateev et al., 1997)

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)
- Formula for $\langle \ell_{-2}\bar{\ell}_{-2}\Phi_\alpha \rangle$ (Fateev et al., 1997)

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)
- Formula for $\langle \ell_{-2}\bar{\ell}_{-2}\Phi_\alpha \rangle$ (Fateev et al., 1997)

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)
- Formula for $\langle \ell_{-2}\bar{\ell}_{-2}\Phi_\alpha \rangle$ (Fateev et al., 1997)

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)
- Formula for $\langle \ell_{-2}\bar{\ell}_{-2}\Phi_\alpha \rangle$ (Fateev et al., 1997)

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)
- Formula for $\langle \ell_{-2}\bar{\ell}_{-2}\Phi_\alpha \rangle$ (Fateev et al., 1997)

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)
- Formula for $\langle \ell_{-2}\bar{\ell}_{-2}\Phi_\alpha \rangle$ (Fateev et al., 1997)

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)
- Formula for $\langle \ell_{-2} \bar{\ell}_{-2} \Phi_\alpha \rangle$ (Fateev et al., 1997)

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)
- Formula for $\langle \ell_{-2}\bar{\ell}_{-2}\Phi_\alpha \rangle$ (Fateev et al., 1997)

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)
- Formula for $\langle \ell_{-2}\bar{\ell}_{-2}\Phi_\alpha \rangle$ (Fateev et al., 1997)

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)
- Formula for $\langle \ell_{-2} \bar{\ell}_{-2} \Phi_\alpha \rangle$ (Fateev et al., 1997)

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)
- Formula for $\langle \ell_{-2}\bar{\ell}_{-2}\Phi_\alpha \rangle$ (Fateev et al., 1997)
- For $R < \infty$ (Zamolodchikov, 2004)

$$\langle T_{z,z} T_{\bar{z},\bar{z}} \rangle = \langle T_{z,z} \rangle \langle T_{\bar{z},\bar{z}} \rangle - \langle T_{z,\bar{z}} \rangle^2$$

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)
- Formula for $\langle \ell_{-2}\bar{\ell}_{-2}\Phi_\alpha \rangle$ (Fateev et al., 1997)
- For $R < \infty$ (Zamolodchikov, 2004)

$$\langle T_{z,z} T_{\bar{z},\bar{z}} \rangle = \langle T_{z,z} \rangle \langle T_{\bar{z},\bar{z}} \rangle - \langle T_{z,\bar{z}} \rangle^2$$

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)
- Formula for $\langle \ell_{-2}\bar{\ell}_{-2}\Phi_\alpha \rangle$ (Fateev et al., 1997)
- For $R < \infty$ (Zamolodchikov, 2004)

$$\langle T_{z,z} T_{\bar{z},\bar{z}} \rangle = \langle T_{z,z} \rangle \langle T_{\bar{z},\bar{z}} \rangle - \langle T_{z,\bar{z}} \rangle^2$$

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)
- Formula for $\langle \ell_{-2} \bar{\ell}_{-2} \Phi_\alpha \rangle$ (Fateev et al., 1997)
- For $R < \infty$ (Zamolodchikov, 2004)

$$\langle T_{z,z} T_{\bar{z},\bar{z}} \rangle = \langle T_{z,z} \rangle \langle T_{\bar{z},\bar{z}} \rangle - \langle T_{z,\bar{z}} \rangle^2$$

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)
- Formula for $\langle \ell_{-2}\bar{\ell}_{-2}\Phi_\alpha \rangle$ (Fateev et al., 1997)
- For $R < \infty$ (Zamolodchikov, 2004)

$$\langle T_{z,z} T_{\bar{z},\bar{z}} \rangle = \langle T_{z,z} \rangle \langle T_{\bar{z},\bar{z}} \rangle - \langle T_{z,\bar{z}} \rangle^2$$

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)
- Formula for $\langle \ell_{-2}\bar{\ell}_{-2}\Phi_\alpha \rangle$ (Fateev et al., 1997)
- For $R < \infty$ (Zamolodchikov, 2004)

$$\langle T_{z,z} T_{\bar{z},\bar{z}} \rangle = \langle T_{z,z} \rangle \langle T_{\bar{z},\bar{z}} \rangle - \langle T_{z,\bar{z}} \rangle^2$$

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)
- Formula for $\langle \ell_{-2}\bar{\ell}_{-2}\Phi_\alpha \rangle$ (Fateev et al., 1997)
- For $R < \infty$ (Zamolodchikov, 2004)

$$\langle T_{z,z} T_{\bar{z},\bar{z}} \rangle = \langle T_{z,z} \rangle \langle T_{\bar{z},\bar{z}} \rangle - \langle T_{z,\bar{z}} \rangle^2$$

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)
- Formula for $\langle \ell_{-2}\bar{\ell}_{-2}\Phi_\alpha \rangle$ (Fateev et al., 1997)
- For $R < \infty$ (Zamolodchikov, 2004)

$$\langle T_{z,z} T_{\bar{z},\bar{z}} \rangle = \langle T_{z,z} \rangle \langle T_{\bar{z},\bar{z}} \rangle - \langle T_{z,\bar{z}} \rangle^2$$

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)
- Formula for $\langle \ell_{-2}\bar{\ell}_{-2}\Phi_\alpha \rangle$ (Fateev et al., 1997)
- For $R < \infty$ (Zamolodchikov, 2004)

$$\langle T_{z,z} T_{\bar{z},\bar{z}} \rangle = \langle T_{z,z} \rangle \langle T_{\bar{z},\bar{z}} \rangle - \langle T_{z,\bar{z}} \rangle^2$$

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)
- Formula for $\langle \ell_{-2}\bar{\ell}_{-2}\Phi_\alpha \rangle$ (Fateev et al., 1997)
- For $R < \infty$ (Zamolodchikov, 2004)

$$\langle T_{z,z} T_{\bar{z},\bar{z}} \rangle = \langle T_{z,z} \rangle \langle T_{\bar{z},\bar{z}} \rangle - \langle T_{z,\bar{z}} \rangle^2$$

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)
- Formula for $\langle \ell_{-2}\bar{\ell}_{-2}\Phi_\alpha \rangle$ (Fateev et al., 1997)
- For $R < \infty$ (Zamolodchikov, 2004)

$$\langle T_{z,z} T_{\bar{z},\bar{z}} \rangle = \langle T_{z,z} \rangle \langle T_{\bar{z},\bar{z}} \rangle - \langle T_{z,\bar{z}} \rangle^2$$

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)
- Formula for $\langle \ell_{-2}\bar{\ell}_{-2}\Phi_\alpha \rangle$ (Fateev et al., 1997)
- For $R < \infty$ (Zamolodchikov, 2004)

$$\langle T_{z,z} T_{\bar{z},\bar{z}} \rangle = \langle T_{z,z} \rangle \langle T_{\bar{z},\bar{z}} \rangle - \langle T_{z,\bar{z}} \rangle^2$$

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)
- Formula for $\langle \ell_{-2}\bar{\ell}_{-2}\Phi_\alpha \rangle$ (Fateev et al., 1997)
- For $R < \infty$ (Zamolodchikov, 2004)

$$\langle T_{z,z} T_{\bar{z},\bar{z}} \rangle = \langle T_{z,z} \rangle \langle T_{\bar{z},\bar{z}} \rangle - \langle T_{z,\bar{z}} \rangle^2$$

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)
- Formula for $\langle \ell_{-2}\bar{\ell}_{-2}\Phi_\alpha \rangle$ (Fateev et al., 1997)
- For $R < \infty$ (Zamolodchikov, 2004)

$$\langle T_{z,z} T_{\bar{z},\bar{z}} \rangle = \langle T_{z,z} \rangle \langle T_{\bar{z},\bar{z}} \rangle - \langle T_{z,\bar{z}} \rangle^2$$

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)
- Formula for $\langle \ell_{-2}\bar{\ell}_{-2}\Phi_\alpha \rangle$ (Fateev et al., 1997)
- For $R < \infty$ (Zamolodchikov, 2004)

$$\langle T_{z,z} T_{\bar{z},\bar{z}} \rangle = \langle T_{z,z} \rangle \langle T_{\bar{z},\bar{z}} \rangle - \langle T_{z,\bar{z}} \rangle^2$$

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)
- Formula for $\langle \ell_{-2}\bar{\ell}_{-2}\Phi_\alpha \rangle$ (Fateev et al., 1997)
- For $R < \infty$ (Zamolodchikov, 2004)

$$\langle T_{z,z} T_{\bar{z},\bar{z}} \rangle = \langle T_{z,z} \rangle \langle T_{\bar{z},\bar{z}} \rangle - \langle T_{z,\bar{z}} \rangle^2$$

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)
- Formula for $\langle \ell_{-2}\bar{\ell}_{-2}\Phi_\alpha \rangle$ (Fateev et al., 1997)
- For $R < \infty$ (Zamolodchikov, 2004)

$$\langle T_{z,z} T_{\bar{z},\bar{z}} \rangle = \langle T_{z,z} \rangle \langle T_{\bar{z},\bar{z}} \rangle - \langle T_{z,\bar{z}} \rangle^2$$

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)
- Formula for $\langle \ell_{-2}\bar{\ell}_{-2}\Phi_\alpha \rangle$ (Fateev et al., 1997)
- For $R < \infty$ (Zamolodchikov, 2004)

$$\langle T_{z,z} T_{\bar{z},\bar{z}} \rangle = \langle T_{z,z} \rangle \langle T_{\bar{z},\bar{z}} \rangle - \langle T_{z,\bar{z}} \rangle^2$$

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)
- Formula for $\langle \ell_{-2}\bar{\ell}_{-2}\Phi_\alpha \rangle$ (Fateev et al., 1997)
- For $R < \infty$ (Zamolodchikov, 2004)

$$\langle T_{z,z} T_{\bar{z},\bar{z}} \rangle = \langle T_{z,z} \rangle \langle T_{\bar{z},\bar{z}} \rangle - \langle T_{z,\bar{z}} \rangle^2$$

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)
- Formula for $\langle \ell_{-2}\bar{\ell}_{-2}\Phi_\alpha \rangle$ (Fateev et al., 1997)
- For $R < \infty$ (Zamolodchikov, 2004)

$$\langle T_{z,z} T_{\bar{z},\bar{z}} \rangle = \langle T_{z,z} \rangle \langle T_{\bar{z},\bar{z}} \rangle - \langle T_{z,\bar{z}} \rangle^2$$

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)
- Formula for $\langle \ell_{-2}\bar{\ell}_{-2}\Phi_\alpha \rangle$ (Fateev et al., 1997)
- For $R < \infty$ (Zamolodchikov, 2004)

$$\langle T_{z,z} T_{\bar{z},\bar{z}} \rangle = \langle T_{z,z} \rangle \langle T_{\bar{z},\bar{z}} \rangle - \langle T_{z,\bar{z}} \rangle^2$$

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)
- Formula for $\langle \ell_{-2}\bar{\ell}_{-2}\Phi_\alpha \rangle$ (Fateev et al., 1997)
- For $R < \infty$ (Zamolodchikov, 2004)

$$\langle T_{z,z} T_{\bar{z},\bar{z}} \rangle = \langle T_{z,z} \rangle \langle T_{\bar{z},\bar{z}} \rangle - \langle T_{z,\bar{z}} \rangle^2$$

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)
- Formula for $\langle \ell_{-2}\bar{\ell}_{-2}\Phi_\alpha \rangle$ (Fateev et al., 1997)
- For $R < \infty$ (Zamolodchikov, 2004)

$$\langle T_{z,z} T_{\bar{z},\bar{z}} \rangle = \langle T_{z,z} \rangle \langle T_{\bar{z},\bar{z}} \rangle - \langle T_{z,\bar{z}} \rangle^2$$

Checks

We have performed various checks against known results.

- Self-consistency
- Formula for $\langle \Phi_\alpha \rangle$ (Lukyanov-Zamolodchikov, 1996)
- Formula for $\langle \ell_{-2}\bar{\ell}_{-2}\Phi_\alpha \rangle$ (Fateev et al., 1997)
- For $R < \infty$ (Zamolodchikov, 2004)

$$\langle T_{z,z} T_{\bar{z},\bar{z}} \rangle = \langle T_{z,z} \rangle \langle T_{\bar{z},\bar{z}} \rangle - \langle T_{z,\bar{z}} \rangle^2$$

Form factors

Form factors

$$f^{(2n)}_{\mathcal{O}}(\theta_1, \cdots, \theta_{2n}) = \langle \theta_1, \cdots, \theta_{2n} | \mathcal{O} | \mathrm{vac} \rangle$$

Solutions to the form factor bootstrap equations are given by integrals (Smirnov, 1986)

$$f^{(2n)}_{\mathcal{O}_\alpha}(\theta_1, \cdots, \theta_{2n}) = \langle \Phi_\alpha \rangle \zeta(\theta_1, \cdots, \theta_{2n}) \times \sum_{\epsilon_1, \cdots, \epsilon_{2n}} w_{\epsilon_1, \cdots, \epsilon_{2n}}(\theta_1, \cdots, \theta_{2n}) \mathcal{F}^{(2n)}_{\mathcal{O}_\alpha}(\theta_{I^-} | \theta_{I^+})$$

$$\mathcal{F}^{(2n)}_{\mathcal{O}_\alpha}(\theta_{I^-} | \theta_{I^+}) = \int d^n \sigma \chi_\alpha(\sigma_1, \cdots, \sigma_n) \ell^{(n)}_{I^+ \sqcup I^-}(\sigma_1, \cdots, \sigma_n) \times L^{(n)}_{\mathcal{O}_\alpha}(S_1, \cdots, S_n)$$

where $S_j = e^{\sigma_j}$.

Form factors

$$f_{\mathcal{O}}^{(2n)}(\theta_1, \cdots, \theta_{2n}) = \langle \theta_1, \cdots, \theta_{2n} | \mathcal{O} | \mathrm{vac} \rangle$$

Solutions to the form factor bootstrap equations are given by integrals (Smirnov, 1986)

$$f_{\mathcal{O}_\alpha}^{(2n)}(\theta_1, \cdots, \theta_{2n}) = \langle \Phi_\alpha \rangle \zeta(\theta_1, \cdots, \theta_{2n})$$
$$\times \sum_{\epsilon_1, \cdots, \epsilon_{2n}} w_{\epsilon_1, \cdots, \epsilon_{2n}}(\theta_1, \cdots, \theta_{2n}) \mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-} | \theta_{I^+})$$

$$\mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-} | \theta_{I^+}) = \int d^n\sigma \chi_\alpha(\sigma_1, \cdots, \sigma_n) \ell_{I^+ \sqcup I^-}^{(n)}(\sigma_1, \cdots, \sigma_n)$$
$$\times L_{\mathcal{O}_\alpha}^{(n)}(S_1, \cdots, S_n)$$

where $S_j = e^{\sigma_j}$.

Form factors

$$f_{\mathcal{O}}^{(2n)}(\theta_1, \cdots, \theta_{2n}) = \langle \theta_1, \cdots, \theta_{2n} | \mathcal{O} | \mathrm{vac} \rangle$$

Solutions to the form factor bootstrap equations are given by integrals (Smirnov, 1986)

$$f_{\mathcal{O}_\alpha}^{(2n)}(\theta_1, \cdots, \theta_{2n}) = \langle \Phi_\alpha \rangle \zeta(\theta_1, \cdots, \theta_{2n}) \times \sum_{\epsilon_1, \cdots, \epsilon_{2n}} w_{\epsilon_1, \cdots, \epsilon_{2n}}(\theta_1, \cdots, \theta_{2n}) \mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-} | \theta_{I^+})$$

$$\mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-} | \theta_{I^+}) = \int d^n \sigma \chi_\alpha(\sigma_1, \cdots, \sigma_n) \ell_{I^+ \sqcup I^-}^{(n)}(\sigma_1, \cdots, \sigma_n) \times L_{\mathcal{O}_\alpha}^{(n)}(S_1, \cdots, S_n)$$

where $S_j = e^{\sigma_j}$.

Form factors

$$f_{\mathcal{O}}^{(2n)}(\theta_1,\cdots,\theta_{2n}) = \langle \theta_1,\cdots,\theta_{2n}|\mathcal{O}|\mathrm{vac}\rangle$$

Solutions to the form factor bootstrap equations are given by integrals (Smirnov, 1986)

$$f_{\mathcal{O}_\alpha}^{(2n)}(\theta_1,\cdots,\theta_{2n}) = \langle \Phi_\alpha\rangle \zeta(\theta_1,\cdots,\theta_{2n}) \times \sum_{\epsilon_1,\cdots,\epsilon_{2n}} w_{\epsilon_1,\cdots,\epsilon_{2n}}(\theta_1,\cdots,\theta_{2n}) \mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-}|\theta_{I^+})$$

$$\mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-}|\theta_{I^+}) = \int d^n\sigma \chi_\alpha(\sigma_1,\cdots,\sigma_n)\ell^{(n)}_{I^+\sqcup I^-}(\sigma_1,\cdots,\sigma_n) \times L_{\mathcal{O}_\alpha}^{(n)}(S_1,\cdots,S_n)$$

where $S_j = e^{\sigma_j}$.

Form factors

$$f_{\mathcal{O}}^{(2n)}(\theta_1, \cdots, \theta_{2n}) = \langle \theta_1, \cdots, \theta_{2n} | \mathcal{O} | \mathrm{vac} \rangle$$

Solutions to the form factor bootstrap equations are given by integrals (Smirnov, 1986)

$$f_{\mathcal{O}_\alpha}^{(2n)}(\theta_1, \cdots, \theta_{2n}) = \langle \Phi_\alpha \rangle \zeta(\theta_1, \cdots, \theta_{2n}) \times \sum_{\epsilon_1, \cdots, \epsilon_{2n}} w_{\epsilon_1, \cdots, \epsilon_{2n}}(\theta_1, \cdots, \theta_{2n}) \mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-} | \theta_{I^+})$$

$$\mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-} | \theta_{I^+}) = \int d^n\sigma \chi_\alpha(\sigma_1, \cdots, \sigma_n) \ell_{I^+ \sqcup I^-}^{(n)}(\sigma_1, \cdots, \sigma_n) \times L_{\mathcal{O}_\alpha}^{(n)}(S_1, \cdots, S_n)$$

where $S_j = e^{\sigma_j}$.

Form factors

$$f_{\mathcal{O}}^{(2n)}(\theta_1, \cdots, \theta_{2n}) = \langle \theta_1, \cdots, \theta_{2n} | \mathcal{O} | \mathrm{vac} \rangle$$

Solutions to the form factor bootstrap equations are given by integrals (Smirnov, 1986)

$$f_{\mathcal{O}_\alpha}^{(2n)}(\theta_1, \cdots, \theta_{2n}) = \langle \Phi_\alpha \rangle \zeta(\theta_1, \cdots, \theta_{2n}) \times \sum_{\epsilon_1, \cdots, \epsilon_{2n}} w_{\epsilon_1, \cdots, \epsilon_{2n}}(\theta_1, \cdots, \theta_{2n}) \mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-} | \theta_{I^+})$$

$$\mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-} | \theta_{I^+}) = \int d^n \sigma \chi_\alpha(\sigma_1, \cdots, \sigma_n) \ell_{I^+ \sqcup I^-}^{(n)}(\sigma_1, \cdots, \sigma_n) \times L_{\mathcal{O}_\alpha}^{(n)}(S_1, \cdots, S_n)$$

where $S_j = e^{\sigma_j}$.

Form factors

$$f_{\mathcal{O}}^{(2n)}(\theta_1, \cdots, \theta_{2n}) = \langle \theta_1, \cdots, \theta_{2n} | \mathcal{O} | \mathrm{vac} \rangle$$

Solutions to the form factor bootstrap equations are given by integrals (Smirnov, 1986)

$$f_{\mathcal{O}_\alpha}^{(2n)}(\theta_1, \cdots, \theta_{2n}) = \langle \Phi_\alpha \rangle \zeta(\theta_1, \cdots, \theta_{2n}) \times \sum_{\epsilon_1, \cdots, \epsilon_{2n}} w_{\epsilon_1, \cdots, \epsilon_{2n}}(\theta_1, \cdots, \theta_{2n}) \mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-} | \theta_{I^+})$$

$$\mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-} | \theta_{I^+}) = \int d^n\sigma \chi_\alpha(\sigma_1, \cdots, \sigma_n) \ell_{I^+ \sqcup I^-}^{(n)}(\sigma_1, \cdots, \sigma_n) \times L_{\mathcal{O}_\alpha}^{(n)}(S_1, \cdots, S_n)$$

where $S_j = e^{\sigma_j}$.

Form factors

$$f_{\mathcal{O}}^{(2n)}(\theta_1, \cdots, \theta_{2n}) = \langle \theta_1, \cdots, \theta_{2n} | \mathcal{O} | \mathrm{vac} \rangle$$

Solutions to the form factor bootstrap equations are given by integrals (Smirnov, 1986)

$$f_{\mathcal{O}_\alpha}^{(2n)}(\theta_1, \cdots, \theta_{2n}) = \langle \Phi_\alpha \rangle \zeta(\theta_1, \cdots, \theta_{2n}) \times \sum_{\epsilon_1, \cdots, \epsilon_{2n}} w_{\epsilon_1, \cdots, \epsilon_{2n}}(\theta_1, \cdots, \theta_{2n}) \mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-} | \theta_{I^+})$$

$$\mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-} | \theta_{I^+}) = \int d^n \sigma \chi_\alpha(\sigma_1, \cdots, \sigma_n) \ell_{I^+ \sqcup I^-}^{(n)}(\sigma_1, \cdots, \sigma_n) \times L_{\mathcal{O}_\alpha}^{(n)}(S_1, \cdots, S_n)$$

where $S_j = e^{\sigma_j}$.

Form factors

$$f_{\mathcal{O}}^{(2n)}(\theta_1,\cdots,\theta_{2n}) = \langle \theta_1,\cdots,\theta_{2n}|\mathcal{O}|\mathrm{vac}\rangle$$

Solutions to the form factor bootstrap equations are given by integrals (Smirnov, 1986)

$$f_{\mathcal{O}_\alpha}^{(2n)}(\theta_1,\cdots,\theta_{2n}) = \langle \Phi_\alpha\rangle \zeta(\theta_1,\cdots,\theta_{2n}) \times \sum_{\epsilon_1,\cdots,\epsilon_{2n}} w_{\epsilon_1,\cdots,\epsilon_{2n}}(\theta_1,\cdots,\theta_{2n}) \mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-}|\theta_{I^+})$$

$$\mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-}|\theta_{I^+}) = \int d^n\sigma \chi_\alpha(\sigma_1,\cdots,\sigma_n) \ell_{I^+\sqcup I^-}^{(n)}(\sigma_1,\cdots,\sigma_n) \times L_{\mathcal{O}_\alpha}^{(n)}(S_1,\cdots,S_n)$$

where $S_j = e^{\sigma_j}$.

Form factors

$$f_{\mathcal{O}}^{(2n)}(\theta_1, \cdots, \theta_{2n}) = \langle \theta_1, \cdots, \theta_{2n} | \mathcal{O} | \mathrm{vac} \rangle$$

Solutions to the form factor bootstrap equations are given by integrals (Smirnov, 1986)

$$f_{\mathcal{O}_\alpha}^{(2n)}(\theta_1, \cdots, \theta_{2n}) = \langle \Phi_\alpha \rangle \zeta(\theta_1, \cdots, \theta_{2n}) \times \sum_{\epsilon_1, \cdots, \epsilon_{2n}} w_{\epsilon_1, \cdots, \epsilon_{2n}}(\theta_1, \cdots, \theta_{2n}) \mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-} | \theta_{I^+})$$

$$\mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-} | \theta_{I^+}) = \int d^n \sigma \chi_\alpha(\sigma_1, \cdots, \sigma_n) \ell_{I^+ \sqcup I^-}^{(n)}(\sigma_1, \cdots, \sigma_n) \times L_{\mathcal{O}_\alpha}^{(n)}(S_1, \cdots, S_n)$$

where $S_j = e^{\sigma_j}$.

Form factors

$$f_{\mathcal{O}}^{(2n)}(\theta_1,\cdots,\theta_{2n}) = \langle\theta_1,\cdots,\theta_{2n}|\mathcal{O}|\mathrm{vac}\rangle$$

Solutions to the form factor bootstrap equations are given by integrals (Smirnov, 1986)

$$f_{\mathcal{O}_\alpha}^{(2n)}(\theta_1,\cdots,\theta_{2n}) = \langle\Phi_\alpha\rangle\zeta(\theta_1,\cdots,\theta_{2n})$$
$$\times \sum_{\epsilon_1,\cdots,\epsilon_{2n}} w_{\epsilon_1,\cdots,\epsilon_{2n}}(\theta_1,\cdots,\theta_{2n})\mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-}|\theta_{I^+})$$

$$\mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-}|\theta_{I^+}) = \int d^n\sigma\,\chi_\alpha(\sigma_1,\cdots,\sigma_n)\ell_{I^+\sqcup I^-}^{(n)}(\sigma_1,\cdots,\sigma_n)$$
$$\times L_{\mathcal{O}_\alpha}^{(n)}(S_1,\cdots,S_n)$$

where $S_j = e^{\sigma_j}$.

Form factors

$$f_{\mathcal{O}}^{(2n)}(\theta_1, \cdots, \theta_{2n}) = \langle \theta_1, \cdots, \theta_{2n} | \mathcal{O} | \mathrm{vac} \rangle$$

Solutions to the form factor bootstrap equations are given by integrals (Smirnov, 1986)

$$f_{\mathcal{O}_\alpha}^{(2n)}(\theta_1, \cdots, \theta_{2n}) = \langle \Phi_\alpha \rangle \zeta(\theta_1, \cdots, \theta_{2n}) \times \sum_{\epsilon_1, \cdots, \epsilon_{2n}} w_{\epsilon_1, \cdots, \epsilon_{2n}}(\theta_1, \cdots, \theta_{2n}) \mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-} | \theta_{I^+})$$

$$\mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-} | \theta_{I^+}) = \int d^n \sigma \chi_\alpha(\sigma_1, \cdots, \sigma_n) \ell^{(n)}_{I^+ \sqcup I^-}(\sigma_1, \cdots, \sigma_n) \times L_{\mathcal{O}_\alpha}^{(n)}(S_1, \cdots, S_n)$$

where $S_j = e^{\sigma_j}$.

Form factors

$$f_{\mathcal{O}}^{(2n)}(\theta_1,\cdots,\theta_{2n}) = \langle \theta_1,\cdots,\theta_{2n}|\mathcal{O}|\mathrm{vac}\rangle$$

Solutions to the form factor bootstrap equations are given by integrals (Smirnov, 1986)

$$f_{\mathcal{O}_\alpha}^{(2n)}(\theta_1,\cdots,\theta_{2n}) = \langle \Phi_\alpha\rangle \zeta(\theta_1,\cdots,\theta_{2n}) \times \sum_{\epsilon_1,\cdots,\epsilon_{2n}} w_{\epsilon_1,\cdots,\epsilon_{2n}}(\theta_1,\cdots,\theta_{2n}) \mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-}|\theta_{I^+})$$

$$\mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-}|\theta_{I^+}) = \int d^n\sigma \chi_\alpha(\sigma_1,\cdots,\sigma_n)\ell^{(n)}_{I^+\sqcup I^-}(\sigma_1,\cdots,\sigma_n) \times L_{\mathcal{O}_\alpha}^{(n)}(S_1,\cdots,S_n)$$

where $S_j = e^{\sigma_j}$.

Form factors

$$f_{\mathcal{O}}^{(2n)}(\theta_1, \cdots, \theta_{2n}) = \langle \theta_1, \cdots, \theta_{2n} | \mathcal{O} | \mathrm{vac} \rangle$$

Solutions to the form factor bootstrap equations are given by integrals (Smirnov, 1986)

$$f_{\mathcal{O}_\alpha}^{(2n)}(\theta_1, \cdots, \theta_{2n}) = \langle \Phi_\alpha \rangle \zeta(\theta_1, \cdots, \theta_{2n}) \times \sum_{\epsilon_1, \cdots, \epsilon_{2n}} w_{\epsilon_1, \cdots, \epsilon_{2n}}(\theta_1, \cdots, \theta_{2n}) \mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-} | \theta_{I^+})$$

$$\mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-} | \theta_{I^+}) = \int d^n \sigma \chi_\alpha(\sigma_1, \cdots, \sigma_n) \ell_{I^+ \sqcup I^-}^{(n)}(\sigma_1, \cdots, \sigma_n) \times L_{\mathcal{O}_\alpha}^{(n)}(S_1, \cdots, S_n)$$

where $S_j = e^{\sigma_j}$.

Form factors

$$f_{\mathcal{O}}^{(2n)}(\theta_1,\cdots,\theta_{2n}) = \langle \theta_1,\cdots,\theta_{2n}|\mathcal{O}|\mathrm{vac}\rangle$$

Solutions to the form factor bootstrap equations are given by integrals (Smirnov, 1986)

$$f_{\mathcal{O}_\alpha}^{(2n)}(\theta_1,\cdots,\theta_{2n}) = \langle \Phi_\alpha\rangle \zeta(\theta_1,\cdots,\theta_{2n}) \times \sum_{\epsilon_1,\cdots,\epsilon_{2n}} w_{\epsilon_1,\cdots,\epsilon_{2n}}(\theta_1,\cdots,\theta_{2n}) \mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-}|\theta_{I^+})$$

$$\mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-}|\theta_{I^+}) = \int d^n\sigma \chi_\alpha(\sigma_1,\cdots,\sigma_n)\ell_{I^+\sqcup I^-}^{(n)}(\sigma_1,\cdots,\sigma_n) \times L_{\mathcal{O}_\alpha}^{(n)}(S_1,\cdots,S_n)$$

where $S_j = e^{\sigma_j}$.

Form factors

$$f_{\mathcal{O}}^{(2n)}(\theta_1, \cdots, \theta_{2n}) = \langle \theta_1, \cdots, \theta_{2n} | \mathcal{O} | \mathrm{vac} \rangle$$

Solutions to the form factor bootstrap equations are given by integrals (Smirnov, 1986)

$$f_{\mathcal{O}_\alpha}^{(2n)}(\theta_1, \cdots, \theta_{2n}) = \langle \Phi_\alpha \rangle \zeta(\theta_1, \cdots, \theta_{2n}) \times \sum_{\epsilon_1, \cdots, \epsilon_{2n}} w_{\epsilon_1, \cdots, \epsilon_{2n}}(\theta_1, \cdots, \theta_{2n}) \mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-} | \theta_{I^+})$$

$$\mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-} | \theta_{I^+}) = \int d^n \sigma \chi_\alpha(\sigma_1, \cdots, \sigma_n) \ell_{I^+ \sqcup I^-}^{(n)}(\sigma_1, \cdots, \sigma_n) \times L_{\mathcal{O}_\alpha}^{(n)}(S_1, \cdots, S_n)$$

where $S_j = e^{\sigma_j}$.

Form factors

$$f_{\mathcal{O}}^{(2n)}(\theta_1,\cdots,\theta_{2n}) = \langle \theta_1,\cdots,\theta_{2n}|\mathcal{O}|\mathrm{vac}\rangle$$

Solutions to the form factor bootstrap equations are given by integrals (Smirnov, 1986)

$$f_{\mathcal{O}_\alpha}^{(2n)}(\theta_1,\cdots,\theta_{2n}) = \langle\Phi_\alpha\rangle\zeta(\theta_1,\cdots,\theta_{2n}) \times \sum_{\epsilon_1,\cdots,\epsilon_{2n}} w_{\epsilon_1,\cdots,\epsilon_{2n}}(\theta_1,\cdots,\theta_{2n})\mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-}|\theta_{I^+})$$

$$\mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-}|\theta_{I^+}) = \int d^n\sigma\,\chi_\alpha(\sigma_1,\cdots,\sigma_n)\ell_{I^+\sqcup I^-}^{(n)}(\sigma_1,\cdots,\sigma_n) \times L_{\mathcal{O}_\alpha}^{(n)}(S_1,\cdots,S_n)$$

where $S_j = e^{\sigma_j}$.

Form factors

$$f_{\mathcal{O}}^{(2n)}(\theta_1, \cdots, \theta_{2n}) = \langle \theta_1, \cdots, \theta_{2n} | \mathcal{O} | \mathrm{vac} \rangle$$

Solutions to the form factor bootstrap equations are given by integrals (Smirnov, 1986)

$$f_{\mathcal{O}_\alpha}^{(2n)}(\theta_1, \cdots, \theta_{2n}) = \langle \Phi_\alpha \rangle \zeta(\theta_1, \cdots, \theta_{2n}) \times \sum_{\epsilon_1, \cdots, \epsilon_{2n}} w_{\epsilon_1, \cdots, \epsilon_{2n}}(\theta_1, \cdots, \theta_{2n}) \mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-} | \theta_{I^+})$$

$$\mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-} | \theta_{I^+}) = \int d^n\sigma \chi_\alpha(\sigma_1, \cdots, \sigma_n) \ell_{I^+ \sqcup I^-}^{(n)}(\sigma_1, \cdots, \sigma_n) \times L_{\mathcal{O}_\alpha}^{(n)}(S_1, \cdots, S_n)$$

where $S_j = e^{\sigma_j}$.

Form factors

$$f_{\mathcal{O}}^{(2n)}(\theta_1, \cdots, \theta_{2n}) = \langle \theta_1, \cdots, \theta_{2n} | \mathcal{O} | \mathrm{vac} \rangle$$

Solutions to the form factor bootstrap equations are given by integrals (Smirnov, 1986)

$$f_{\mathcal{O}_\alpha}^{(2n)}(\theta_1, \cdots, \theta_{2n}) = \langle \Phi_\alpha \rangle \zeta(\theta_1, \cdots, \theta_{2n}) \times \sum_{\epsilon_1, \cdots, \epsilon_{2n}} w_{\epsilon_1, \cdots, \epsilon_{2n}}(\theta_1, \cdots, \theta_{2n}) \mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-} | \theta_{I^+})$$

$$\mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-} | \theta_{I^+}) = \int d^n\sigma \chi_\alpha(\sigma_1, \cdots, \sigma_n) \ell_{I^+ \sqcup I^-}^{(n)}(\sigma_1, \cdots, \sigma_n) \times L_{\mathcal{O}_\alpha}^{(n)}(S_1, \cdots, S_n)$$

where $S_j = e^{\sigma_j}$.

Form factors

$$f_{\mathcal{O}}^{(2n)}(\theta_1,\cdots,\theta_{2n}) = \langle\theta_1,\cdots,\theta_{2n}|\mathcal{O}|\mathrm{vac}\rangle$$

Solutions to the form factor bootstrap equations are given by integrals (Smirnov, 1986)

$$f_{\mathcal{O}_\alpha}^{(2n)}(\theta_1,\cdots,\theta_{2n}) = \langle\Phi_\alpha\rangle\zeta(\theta_1,\cdots,\theta_{2n}) \times \sum_{\epsilon_1,\cdots,\epsilon_{2n}} w_{\epsilon_1,\cdots,\epsilon_{2n}}(\theta_1,\cdots,\theta_{2n})\mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-}|\theta_{I^+})$$

$$\mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-}|\theta_{I^+}) = \int d^n\sigma\chi_\alpha(\sigma_1,\cdots,\sigma_n)\ell_{I^+\sqcup I^-}^{(n)}(\sigma_1,\cdots,\sigma_n) \times L_{\mathcal{O}_\alpha}^{(n)}(S_1,\cdots,S_n)$$

where $S_j = e^{\sigma_j}$.

Form factors

$$f_{\mathcal{O}}^{(2n)}(\theta_1, \cdots, \theta_{2n}) = \langle \theta_1, \cdots, \theta_{2n} | \mathcal{O} | \mathrm{vac} \rangle$$

Solutions to the form factor bootstrap equations are given by integrals (Smirnov, 1986)

$$f_{\mathcal{O}_\alpha}^{(2n)}(\theta_1, \cdots, \theta_{2n}) = \langle \Phi_\alpha \rangle \zeta(\theta_1, \cdots, \theta_{2n}) \times \sum_{\epsilon_1, \cdots, \epsilon_{2n}} w_{\epsilon_1, \cdots, \epsilon_{2n}}(\theta_1, \cdots, \theta_{2n}) \mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-} | \theta_{I^+})$$

$$\mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-} | \theta_{I^+}) = \int d^n \sigma \chi_\alpha(\sigma_1, \cdots, \sigma_n) \ell_{I^+ \sqcup I^-}^{(n)}(\sigma_1, \cdots, \sigma_n) \times L_{\mathcal{O}_\alpha}^{(n)}(S_1, \cdots, S_n)$$

where $S_j = e^{\sigma_j}$.

Form factors

$$f_{\mathcal{O}}^{(2n)}(\theta_1,\cdots,\theta_{2n}) = \langle \theta_1,\cdots,\theta_{2n}|\mathcal{O}|\mathrm{vac}\rangle$$

Solutions to the form factor bootstrap equations are given by integrals (Smirnov, 1986)

$$f_{\mathcal{O}_\alpha}^{(2n)}(\theta_1,\cdots,\theta_{2n}) = \langle \Phi_\alpha\rangle \zeta(\theta_1,\cdots,\theta_{2n}) \times \sum_{\epsilon_1,\cdots,\epsilon_{2n}} w_{\epsilon_1,\cdots,\epsilon_{2n}}(\theta_1,\cdots,\theta_{2n}) \mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-}|\theta_{I^+})$$

$$\mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-}|\theta_{I^+}) = \int d^n\sigma \chi_\alpha(\sigma_1,\cdots,\sigma_n) \ell_{I^+\sqcup I^-}^{(n)}(\sigma_1,\cdots,\sigma_n) \times L_{\mathcal{O}_\alpha}^{(n)}(S_1,\cdots,S_n)$$

where $S_j = e^{\sigma_j}$.

Form factors

$$f_{\mathcal{O}}^{(2n)}(\theta_1, \cdots, \theta_{2n}) = \langle \theta_1, \cdots, \theta_{2n} | \mathcal{O} | \text{vac} \rangle$$

Solutions to the form factor bootstrap equations are given by integrals (Smirnov, 1986)

$$f_{\mathcal{O}_\alpha}^{(2n)}(\theta_1, \cdots, \theta_{2n}) = \langle \Phi_\alpha \rangle \zeta(\theta_1, \cdots, \theta_{2n}) \\ \times \sum_{\epsilon_1, \cdots, \epsilon_{2n}} w_{\epsilon_1, \cdots, \epsilon_{2n}}(\theta_1, \cdots, \theta_{2n}) \mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-} | \theta_{I^+})$$

$$\mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-} | \theta_{I^+}) = \int d^n \sigma \chi_\alpha(\sigma_1, \cdots, \sigma_n) \ell_{I^+ \sqcup I^-}^{(n)}(\sigma_1, \cdots, \sigma_n) \\ \times L_{\mathcal{O}_\alpha}^{(n)}(S_1, \cdots, S_n)$$

where $S_j = e^{\sigma_j}$.

Form factors

$$f_{\mathcal{O}}^{(2n)}(\theta_1, \cdots, \theta_{2n}) = \langle \theta_1, \cdots, \theta_{2n} | \mathcal{O} | \mathrm{vac} \rangle$$

Solutions to the form factor bootstrap equations are given by integrals (Smirnov, 1986)

$$f_{\mathcal{O}_\alpha}^{(2n)}(\theta_1, \cdots, \theta_{2n}) = \langle \Phi_\alpha \rangle \zeta(\theta_1, \cdots, \theta_{2n}) \times \sum_{\epsilon_1, \cdots, \epsilon_{2n}} w_{\epsilon_1, \cdots, \epsilon_{2n}}(\theta_1, \cdots, \theta_{2n}) \mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-} | \theta_{I^+})$$

$$\mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-} | \theta_{I^+}) = \int d^n \sigma \chi_\alpha(\sigma_1, \cdots, \sigma_n) \ell_{I^+ \sqcup I^-}^{(n)}(\sigma_1, \cdots, \sigma_n) \times L_{\mathcal{O}_\alpha}^{(n)}(S_1, \cdots, S_n)$$

where $S_j = e^{\sigma_j}$.

Form factors

$$f_{\mathcal{O}}^{(2n)}(\theta_1, \cdots, \theta_{2n}) = \langle \theta_1, \cdots, \theta_{2n} | \mathcal{O} | \mathrm{vac} \rangle$$

Solutions to the form factor bootstrap equations are given by integrals (Smirnov, 1986)

$$f_{\mathcal{O}_\alpha}^{(2n)}(\theta_1, \cdots, \theta_{2n}) = \langle \Phi_\alpha \rangle \zeta(\theta_1, \cdots, \theta_{2n}) \times \sum_{\epsilon_1, \cdots, \epsilon_{2n}} w_{\epsilon_1, \cdots, \epsilon_{2n}}(\theta_1, \cdots, \theta_{2n}) \mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-} | \theta_{I^+})$$

$$\mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-} | \theta_{I^+}) = \int d^n \sigma \chi_\alpha(\sigma_1, \cdots, \sigma_n) \ell_{I^+ \sqcup I^-}^{(n)}(\sigma_1, \cdots, \sigma_n) \times L_{\mathcal{O}_\alpha}^{(n)}(S_1, \cdots, S_n)$$

where $S_j = e^{\sigma_j}$.

Form factors

$$f_{\mathcal{O}}^{(2n)}(\theta_1, \cdots, \theta_{2n}) = \langle \theta_1, \cdots, \theta_{2n} | \mathcal{O} | \mathrm{vac} \rangle$$

Solutions to the form factor bootstrap equations are given by integrals (Smirnov, 1986)

$$f_{\mathcal{O}_\alpha}^{(2n)}(\theta_1, \cdots, \theta_{2n}) = \langle \Phi_\alpha \rangle \zeta(\theta_1, \cdots, \theta_{2n}) \times \sum_{\epsilon_1, \cdots, \epsilon_{2n}} w_{\epsilon_1, \cdots, \epsilon_{2n}}(\theta_1, \cdots, \theta_{2n}) \mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-} | \theta_{I^+})$$

$$\mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-} | \theta_{I^+}) = \int d^n \sigma \chi_\alpha(\sigma_1, \cdots, \sigma_n) \ell_{I^+ \sqcup I^-}^{(n)}(\sigma_1, \cdots, \sigma_n) \times L_{\mathcal{O}_\alpha}^{(n)}(S_1, \cdots, S_n)$$

where $S_j = e^{\sigma_j}$.

Form factors

$$f_{\mathcal{O}}^{(2n)}(\theta_1, \cdots, \theta_{2n}) = \langle \theta_1, \cdots, \theta_{2n} | \mathcal{O} | \mathrm{vac} \rangle$$

Solutions to the form factor bootstrap equations are given by integrals (Smirnov, 1986)

$$f_{\mathcal{O}_\alpha}^{(2n)}(\theta_1, \cdots, \theta_{2n}) = \langle \Phi_\alpha \rangle \zeta(\theta_1, \cdots, \theta_{2n}) \times \sum_{\epsilon_1, \cdots, \epsilon_{2n}} w_{\epsilon_1, \cdots, \epsilon_{2n}}(\theta_1, \cdots, \theta_{2n}) \mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-} | \theta_{I^+})$$

$$\mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-} | \theta_{I^+}) = \int d^n \sigma \chi_\alpha(\sigma_1, \cdots, \sigma_n) \ell_{I^+ \sqcup I^-}^{(n)}(\sigma_1, \cdots, \sigma_n) \times L_{\mathcal{O}_\alpha}^{(n)}(S_1, \cdots, S_n)$$

where $S_j = e^{\sigma_j}$.

Form factors

$$f_{\mathcal{O}}^{(2n)}(\theta_1,\cdots,\theta_{2n}) = \langle\theta_1,\cdots,\theta_{2n}|\mathcal{O}|\mathrm{vac}\rangle$$

Solutions to the form factor bootstrap equations are given by integrals (Smirnov, 1986)

$$f_{\mathcal{O}_\alpha}^{(2n)}(\theta_1,\cdots,\theta_{2n}) = \langle\Phi_\alpha\rangle\zeta(\theta_1,\cdots,\theta_{2n}) \times \sum_{\epsilon_1,\cdots,\epsilon_{2n}} w_{\epsilon_1,\cdots,\epsilon_{2n}}(\theta_1,\cdots,\theta_{2n})\mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-}|\theta_{I^+})$$

$$\mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-}|\theta_{I^+}) = \int d^n\sigma\chi_\alpha(\sigma_1,\cdots,\sigma_n)\ell_{I^+\sqcup I^-}^{(n)}(\sigma_1,\cdots,\sigma_n) \times L_{\mathcal{O}_\alpha}^{(n)}(S_1,\cdots,S_n)$$

where $S_j = e^{\sigma_j}$.

Form factors

$$f_{\mathcal{O}}^{(2n)}(\theta_1, \cdots, \theta_{2n}) = \langle \theta_1, \cdots, \theta_{2n} | \mathcal{O} | \mathrm{vac} \rangle$$

Solutions to the form factor bootstrap equations are given by integrals (Smirnov, 1986)

$$f_{\mathcal{O}_\alpha}^{(2n)}(\theta_1, \cdots, \theta_{2n}) = \langle \Phi_\alpha \rangle \zeta(\theta_1, \cdots, \theta_{2n}) \times \sum_{\epsilon_1, \cdots, \epsilon_{2n}} w_{\epsilon_1, \cdots, \epsilon_{2n}}(\theta_1, \cdots, \theta_{2n}) \mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-} | \theta_{I^+})$$

$$\mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-} | \theta_{I^+}) = \int d^n \sigma \chi_\alpha(\sigma_1, \cdots, \sigma_n) \ell_{I^+ \sqcup I^-}^{(n)}(\sigma_1, \cdots, \sigma_n) \times L_{\mathcal{O}_\alpha}^{(n)}(S_1, \cdots, S_n)$$

where $S_j = e^{\sigma_j}$.

Form factors

$$f_{\mathcal{O}}^{(2n)}(\theta_1,\cdots,\theta_{2n}) = \langle\theta_1,\cdots,\theta_{2n}|\mathcal{O}|\mathrm{vac}\rangle$$

Solutions to the form factor bootstrap equations are given by integrals (Smirnov, 1986)

$$f_{\mathcal{O}_\alpha}^{(2n)}(\theta_1,\cdots,\theta_{2n}) = \langle\Phi_\alpha\rangle\zeta(\theta_1,\cdots,\theta_{2n}) \times \sum_{\epsilon_1,\cdots,\epsilon_{2n}} w_{\epsilon_1,\cdots,\epsilon_{2n}}(\theta_1,\cdots,\theta_{2n})\mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-}|\theta_{I^+})$$

$$\mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-}|\theta_{I^+}) = \int d^n\sigma\chi_\alpha(\sigma_1,\cdots,\sigma_n)\ell_{I^+\sqcup I^-}^{(n)}(\sigma_1,\cdots,\sigma_n) \times L_{\mathcal{O}_\alpha}^{(n)}(S_1,\cdots,S_n)$$

where $S_j = e^{\sigma_j}$.

Form factors

$$f_{\mathcal{O}}^{(2n)}(\theta_1,\cdots,\theta_{2n}) = \langle\theta_1,\cdots,\theta_{2n}|\mathcal{O}|\mathrm{vac}\rangle$$

Solutions to the form factor bootstrap equations are given by integrals (Smirnov, 1986)

$$f_{\mathcal{O}_\alpha}^{(2n)}(\theta_1,\cdots,\theta_{2n}) = \langle\Phi_\alpha\rangle\zeta(\theta_1,\cdots,\theta_{2n}) \times \sum_{\epsilon_1,\cdots,\epsilon_{2n}} w_{\epsilon_1,\cdots,\epsilon_{2n}}(\theta_1,\cdots,\theta_{2n})\mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-}|\theta_{I^+})$$

$$\mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-}|\theta_{I^+}) = \int d^n\sigma\chi_\alpha(\sigma_1,\cdots,\sigma_n)\ell^{(n)}_{I^+\sqcup I^-}(\sigma_1,\cdots,\sigma_n) \times L^{(n)}_{\mathcal{O}_\alpha}(S_1,\cdots,S_n)$$

where $S_j = e^{\sigma_j}$.

Form factors

$$f_{\mathcal{O}}^{(2n)}(\theta_1, \cdots, \theta_{2n}) = \langle \theta_1, \cdots, \theta_{2n} | \mathcal{O} | \mathrm{vac} \rangle$$

Solutions to the form factor bootstrap equations are given by integrals (Smirnov, 1986)

$$f_{\mathcal{O}_\alpha}^{(2n)}(\theta_1, \cdots, \theta_{2n}) = \langle \Phi_\alpha \rangle \zeta(\theta_1, \cdots, \theta_{2n}) \times \sum_{\epsilon_1, \cdots, \epsilon_{2n}} w_{\epsilon_1, \cdots, \epsilon_{2n}}(\theta_1, \cdots, \theta_{2n}) \mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-} | \theta_{I^+})$$

$$\mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-} | \theta_{I^+}) = \int d^n\sigma \chi_\alpha(\sigma_1, \cdots, \sigma_n) \ell_{I^+ \sqcup I^-}^{(n)}(\sigma_1, \cdots, \sigma_n) \times L_{\mathcal{O}_\alpha}^{(n)}(S_1, \cdots, S_n)$$

where $S_j = e^{\sigma_j}$.

Form factors

$$f_{\mathcal{O}}^{(2n)}(\theta_1, \cdots, \theta_{2n}) = \langle \theta_1, \cdots, \theta_{2n} | \mathcal{O} | \mathrm{vac} \rangle$$

Solutions to the form factor bootstrap equations are given by integrals (Smirnov, 1986)

$$f_{\mathcal{O}_\alpha}^{(2n)}(\theta_1, \cdots, \theta_{2n}) = \langle \Phi_\alpha \rangle \zeta(\theta_1, \cdots, \theta_{2n}) \times \sum_{\epsilon_1, \cdots, \epsilon_{2n}} w_{\epsilon_1, \cdots, \epsilon_{2n}}(\theta_1, \cdots, \theta_{2n}) \mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-} | \theta_{I^+})$$

$$\mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-} | \theta_{I^+}) = \int d^n \sigma \chi_\alpha(\sigma_1, \cdots, \sigma_n) \ell_{I^+ \sqcup I^-}^{(n)}(\sigma_1, \cdots, \sigma_n) \times L_{\mathcal{O}_\alpha}^{(n)}(S_1, \cdots, S_n)$$

where $S_j = e^{\sigma_j}$.

Form factors

$$f_{\mathcal{O}}^{(2n)}(\theta_1, \cdots, \theta_{2n}) = \langle \theta_1, \cdots, \theta_{2n} | \mathcal{O} | \mathrm{vac} \rangle$$

Solutions to the form factor bootstrap equations are given by integrals (Smirnov, 1986)

$$f_{\mathcal{O}_\alpha}^{(2n)}(\theta_1, \cdots, \theta_{2n}) = \langle \Phi_\alpha \rangle \zeta(\theta_1, \cdots, \theta_{2n})$$
$$\times \sum_{\epsilon_1, \cdots, \epsilon_{2n}} w_{\epsilon_1, \cdots, \epsilon_{2n}}(\theta_1, \cdots, \theta_{2n}) \mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-} | \theta_{I^+})$$
$$\mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-} | \theta_{I^+}) = \int d^n \sigma \chi_\alpha(\sigma_1, \cdots, \sigma_n) \ell_{I^+ \sqcup I^-}^{(n)}(\sigma_1, \cdots, \sigma_n)$$
$$\times L_{\mathcal{O}_\alpha}^{(n)}(S_1, \cdots, S_n)$$

where $S_j = e^{\sigma_j}$.

Form factors

$$f_{\mathcal{O}}^{(2n)}(\theta_1,\cdots,\theta_{2n}) = \langle \theta_1,\cdots,\theta_{2n}|\mathcal{O}|\mathrm{vac}\rangle$$

Solutions to the form factor bootstrap equations are given by integrals (Smirnov, 1986)

$$\begin{aligned} f_{\mathcal{O}_\alpha}^{(2n)}(\theta_1,\cdots,\theta_{2n}) &= \langle \Phi_\alpha\rangle \zeta(\theta_1,\cdots,\theta_{2n}) \\ &\times \sum_{\epsilon_1,\cdots,\epsilon_{2n}} w_{\epsilon_1,\cdots,\epsilon_{2n}}(\theta_1,\cdots,\theta_{2n}) \mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-}|\theta_{I^+}) \\ \mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-}|\theta_{I^+}) &= \int d^n\sigma \chi_\alpha(\sigma_1,\cdots,\sigma_n) \ell_{I^+\sqcup I^-}^{(n)}(\sigma_1,\cdots,\sigma_n) \\ &\times L_{\mathcal{O}_\alpha}^{(n)}(S_1,\cdots,S_n) \end{aligned}$$

where $S_j = e^{\sigma_j}$.

Form factors

$$f_{\mathcal{O}}^{(2n)}(\theta_1, \cdots, \theta_{2n}) = \langle \theta_1, \cdots, \theta_{2n} | \mathcal{O} | \mathrm{vac} \rangle$$

Solutions to the form factor bootstrap equations are given by integrals (Smirnov, 1986)

$$f_{\mathcal{O}_\alpha}^{(2n)}(\theta_1, \cdots, \theta_{2n}) = \langle \Phi_\alpha \rangle \zeta(\theta_1, \cdots, \theta_{2n}) \times \sum_{\epsilon_1, \cdots, \epsilon_{2n}} w_{\epsilon_1, \cdots, \epsilon_{2n}}(\theta_1, \cdots, \theta_{2n}) \mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-} | \theta_{I^+})$$

$$\mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-} | \theta_{I^+}) = \int d^n\sigma \chi_\alpha(\sigma_1, \cdots, \sigma_n) \ell_{I^+ \sqcup I^-}^{(n)}(\sigma_1, \cdots, \sigma_n) \times L_{\mathcal{O}_\alpha}^{(n)}(S_1, \cdots, S_n)$$

where $S_j = e^{\sigma_j}$.

Form factors

$$f_{\mathcal{O}}^{(2n)}(\theta_1,\cdots,\theta_{2n}) = \langle\theta_1,\cdots,\theta_{2n}|\mathcal{O}|\mathrm{vac}\rangle$$

Solutions to the form factor bootstrap equations are given by integrals (Smirnov, 1986)

$$f_{\mathcal{O}_\alpha}^{(2n)}(\theta_1,\cdots,\theta_{2n}) = \langle\Phi_\alpha\rangle\zeta(\theta_1,\cdots,\theta_{2n}) \times \sum_{\epsilon_1,\cdots,\epsilon_{2n}} w_{\epsilon_1,\cdots,\epsilon_{2n}}(\theta_1,\cdots,\theta_{2n})\mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-}|\theta_{I^+})$$

$$\mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-}|\theta_{I^+}) = \int d^n\sigma\chi_\alpha(\sigma_1,\cdots,\sigma_n)\ell_{I^+\sqcup I^-}^{(n)}(\sigma_1,\cdots,\sigma_n) \times L_{\mathcal{O}_\alpha}^{(n)}(S_1,\cdots,S_n)$$

where $S_j = e^{\sigma_j}$.

Form factors

$$f_{\mathcal{O}}^{(2n)}(\theta_1, \cdots, \theta_{2n}) = \langle \theta_1, \cdots, \theta_{2n} | \mathcal{O} | \text{vac} \rangle$$

Solutions to the form factor bootstrap equations are given by integrals (Smirnov, 1986)

$$f_{\mathcal{O}_\alpha}^{(2n)}(\theta_1, \cdots, \theta_{2n}) = \langle \Phi_\alpha \rangle \zeta(\theta_1, \cdots, \theta_{2n}) \times \sum_{\epsilon_1, \cdots, \epsilon_{2n}} w_{\epsilon_1, \cdots, \epsilon_{2n}}(\theta_1, \cdots, \theta_{2n}) \mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-} | \theta_{I^+})$$

$$\mathcal{F}_{\mathcal{O}_\alpha}^{(2n)}(\theta_{I^-} | \theta_{I^+}) = \int d^n \sigma \chi_\alpha(\sigma_1, \cdots, \sigma_n) \ell^{(n)}_{I^+ \sqcup I^-}(\sigma_1, \cdots, \sigma_n) \times L^{(n)}_{\mathcal{O}_\alpha}(S_1, \cdots, S_n)$$

where $S_j = e^{\sigma_j}$.

$L^{(n)}_{\mathcal{O}_\alpha}(S_1, \cdots, S_n | B_1, \cdots, B_{2n})$ is a Laurent polynomial such that

$L^{(n)}_{\mathcal{O}_\alpha}(S_1, \cdots, S_n | B_1, \cdots, B_{2n})$ is a Laurent polynomial such that

$L^{(n)}_{\mathcal{O}_\alpha}(S_1, \cdots, S_n | B_1, \cdots, B_{2n})$ is a Laurent polynomial such that

- anti-symmetric in S_j, symmetric in B_i

$L^{(n)}_{\mathcal{O}_\alpha}(S_1, \cdots, S_n | B_1, \cdots, B_{2n})$ is a Laurent polynomial such that

- anti-symmetric in S_j, symmetric in B_i

$L^{(n)}_{\mathcal{O}_\alpha}(S_1, \cdots, S_n | B_1, \cdots, B_{2n})$ is a Laurent polynomial such that

- anti-symmetric in S_j, symmetric in B_i
- recurrence relation

$$L^{(n)}_{\mathcal{O}}\Big|_{B_{2n-1}=B_{2n}=S_n} = S_n \prod_{i=1}^{n-1}(S_i^2 - S_n^2) \cdot L^{(n-1)}_{\mathcal{O}}(S_1, \cdots, S_{n-1} | B_1, \cdots, B$$

$L^{(n)}_{\mathcal{O}_\alpha}(S_1, \cdots, S_n | B_1, \cdots, B_{2n})$ is a Laurent polynomial such that

- anti-symmetric in S_j, symmetric in B_i
- recurrence relation

$$L^{(n)}_{\mathcal{O}}\Big|_{B_{2n-1}=B_{2n}=S_n} = S_n \prod_{i=1}^{n-1}(S_i^2 - S_n^2) \cdot L^{(n-1)}_{\mathcal{O}}(S_1, \cdots, S_{n-1} | B_1, \cdots, B$$

$L^{(n)}_{\mathcal{O}_\alpha}(S_1, \cdots, S_n | B_1, \cdots, B_{2n})$ is a Laurent polynomial such that

- anti-symmetric in S_j, symmetric in B_i
- recurrence relation

$$L^{(n)}_{\mathcal{O}}\Big|_{B_{2n-1}=B_{2n}=S_n} = S_n \prod_{i=1}^{n-1}(S_i^2 - S_n^2) \cdot L^{(n-1)}_{\mathcal{O}}(S_1, \cdots, S_{n-1} | B_1, \cdots, B$$

$L^{(n)}_{\mathcal{O}_\alpha}(S_1,\cdots,S_n|B_1,\cdots,B_{2n})$ is a Laurent polynomial such that

- anti-symmetric in S_j, symmetric in B_i
- recurrence relation

$$L^{(n)}_{\mathcal{O}}\Big|_{B_{2n-1}=B_{2n}=S_n} = S_n \prod_{i=1}^{n-1}(S_i^2 - S_n^2)\cdot L^{(n-1)}_{\mathcal{O}}(S_1,\cdots,S_{n-1}|B_1,\cdots,B$$

$L^{(n)}_{\mathcal{O}_\alpha}(S_1, \cdots, S_n | B_1, \cdots, B_{2n})$ is a Laurent polynomial such that

- anti-symmetric in S_j, symmetric in B_i
- recurrence relation

$$L^{(n)}_{\mathcal{O}}\Big|_{B_{2n-1}=B_{2n}=S_n} = S_n \prod_{i=1}^{n-1}(S_i^2 - S_n^2) \cdot L^{(n-1)}_{\mathcal{O}}(S_1, \cdots, S_{n-1} | B_1, \cdots, B$$

$L^{(n)}_{\mathcal{O}_\alpha}(S_1, \cdots, S_n|B_1, \cdots, B_{2n})$ is a Laurent polynomial such that

- anti-symmetric in S_j, symmetric in B_i
- recurrence relation

$$L^{(n)}_{\mathcal{O}}\Big|_{B_{2n-1}=B_{2n}=S_n} = S_n \prod_{i=1}^{n-1}(S_i^2 - S_n^2) \cdot L^{(n-1)}_{\mathcal{O}}(S_1, \cdots, S_{n-1}|B_1, \cdots, B$$

$L^{(n)}_{\mathcal{O}_\alpha}(S_1, \cdots, S_n | B_1, \cdots, B_{2n})$ is a Laurent polynomial such that

- anti-symmetric in S_j, symmetric in B_i
- recurrence relation

$$L^{(n)}_{\mathcal{O}}\Big|_{B_{2n-1}=B_{2n}=S_n} = S_n \prod_{i=1}^{n-1}(S_i^2 - S_n^2) \cdot L^{(n-1)}_{\mathcal{O}}(S_1, \cdots, S_{n-1} | B_1, \cdots, B$$

$L^{(n)}_{\mathcal{O}_\alpha}(S_1, \cdots, S_n | B_1, \cdots, B_{2n})$ is a Laurent polynomial such that

- anti-symmetric in S_j, symmetric in B_i
- recurrence relation

$$L^{(n)}_{\mathcal{O}}\Big|_{B_{2n-1}=B_{2n}=S_n} = S_n \prod_{i=1}^{n-1}(S_i^2 - S_n^2) \cdot L^{(n-1)}_{\mathcal{O}}(S_1, \cdots, S_{n-1} | B_1, \cdots, B$$

$L^{(n)}_{\mathcal{O}_\alpha}(S_1, \cdots, S_n | B_1, \cdots, B_{2n})$ is a Laurent polynomial such that

- anti-symmetric in S_j, symmetric in B_i
- recurrence relation

$$L^{(n)}_{\mathcal{O}}\Big|_{B_{2n-1}=B_{2n}=S_n} = S_n \prod_{i=1}^{n-1}(S_i^2 - S_n^2) \cdot L^{(n-1)}_{\mathcal{O}}(S_1, \cdots, S_{n-1}|B_1, \cdots, B$$

$L^{(n)}_{\mathcal{O}_\alpha}(S_1, \cdots, S_n | B_1, \cdots, B_{2n})$ is a Laurent polynomial such that

- anti-symmetric in S_j, symmetric in B_i
- recurrence relation

$$L^{(n)}_{\mathcal{O}}\Big|_{B_{2n-1}=B_{2n}=S_n} = S_n \prod_{i=1}^{n-1}(S_i^2 - S_n^2) \cdot L^{(n-1)}_{\mathcal{O}}(S_1, \cdots, S_{n-1} | B_1, \cdots, B$$

$L^{(n)}_{\mathcal{O}_\alpha}(S_1, \cdots, S_n | B_1, \cdots, B_{2n})$ is a Laurent polynomial such that

- anti-symmetric in S_j, symmetric in B_i
- recurrence relation

$$L^{(n)}_{\mathcal{O}}\Big|_{B_{2n-1}=B_{2n}=S_n} = S_n \prod_{i=1}^{n-1}(S_i^2 - S_n^2) \cdot L^{(n-1)}_{\mathcal{O}}(S_1, \cdots, S_{n-1} | B_1, \cdots, B$$

$L^{(n)}_{\mathcal{O}_\alpha}(S_1, \cdots, S_n | B_1, \cdots, B_{2n})$ is a Laurent polynomial such that

- anti-symmetric in S_j, symmetric in B_i
- recurrence relation

$$L^{(n)}_{\mathcal{O}}\Big|_{B_{2n-1}=B_{2n}=S_n} = S_n \prod_{i=1}^{n-1}(S_i^2 - S_n^2) \cdot L^{(n-1)}_{\mathcal{O}}(S_1, \cdots, S_{n-1} | B_1, \cdots, B$$

$L^{(n)}_{\mathcal{O}_\alpha}(S_1, \cdots, S_n | B_1, \cdots, B_{2n})$ is a Laurent polynomial such that

- anti-symmetric in S_j, symmetric in B_i
- recurrence relation

$$L^{(n)}_{\mathcal{O}}\Big|_{B_{2n-1}=B_{2n}=S_n} = S_n \prod_{i=1}^{n-1}(S_i^2 - S_n^2) \cdot L^{(n-1)}_{\mathcal{O}}(S_1, \cdots, S_{n-1} | B_1, \cdots, B$$

$L^{(n)}_{\mathcal{O}_\alpha}(S_1, \cdots, S_n | B_1, \cdots, B_{2n})$ is a Laurent polynomial such that

- anti-symmetric in S_j, symmetric in B_i
- recurrence relation

$$L^{(n)}_{\mathcal{O}}\Big|_{B_{2n-1}=B_{2n}=S_n} = S_n \prod_{i=1}^{n-1}(S_i^2 - S_n^2) \cdot L^{(n-1)}_{\mathcal{O}}(S_1, \cdots, S_{n-1} | B_1, \cdots, B$$

$L^{(n)}_{\mathcal{O}_\alpha}(S_1, \cdots, S_n | B_1, \cdots, B_{2n})$ is a Laurent polynomial such that

- anti-symmetric in S_j, symmetric in B_i
- recurrence relation

$$L^{(n)}_{\mathcal{O}}\Big|_{B_{2n-1}=B_{2n}=S_n} = S_n \prod_{i=1}^{n-1}(S_i^2 - S_n^2) \cdot L^{(n-1)}_{\mathcal{O}}(S_1, \cdots, S_{n-1} | B_1, \cdots, B$$

For the primary field:

$$L^{(n)}_{\Phi_\alpha}(S_1, \cdots, S_n) = \prod_{p=1}^{n} S_p \prod_{p>r}(S_p^2 - S_r^2)\,.$$

$L^{(n)}_{\mathcal{O}_\alpha}(S_1,\cdots,S_n|B_1,\cdots,B_{2n})$ is a Laurent polynomial such that

- anti-symmetric in S_j, symmetric in B_i
- recurrence relation

$$L^{(n)}_{\mathcal{O}}\Big|_{B_{2n-1}=B_{2n}=S_n} = S_n\prod_{i=1}^{n-1}(S_i^2-S_n^2)\cdot L^{(n-1)}_{\mathcal{O}}(S_1,\cdots,S_{n-1}|B_1,\cdots,B$$

For the primary field:

$$L^{(n)}_{\Phi_\alpha}(S_1,\cdots,S_n)=\prod_{p=1}^{n}S_p\prod_{p>r}(S_p^2-S_r^2)\,.$$

$L^{(n)}_{\mathcal{O}_\alpha}(S_1, \cdots, S_n | B_1, \cdots, B_{2n})$ is a Laurent polynomial such that

- anti-symmetric in S_j, symmetric in B_i
- recurrence relation

$$L^{(n)}_{\mathcal{O}}\Big|_{B_{2n-1}=B_{2n}=S_n} = S_n \prod_{i=1}^{n-1}(S_i^2 - S_n^2) \cdot L^{(n-1)}_{\mathcal{O}}(S_1, \cdots, S_{n-1} | B_1, \cdots, B$$

For the primary field:

$$L^{(n)}_{\Phi_\alpha}(S_1, \cdots, S_n) = \prod_{p=1}^{n} S_p \prod_{p>r}(S_p^2 - S_r^2) .$$

$L^{(n)}_{\mathcal{O}_\alpha}(S_1,\cdots,S_n|B_1,\cdots,B_{2n})$ is a Laurent polynomial such that

- anti-symmetric in S_j, symmetric in B_i
- recurrence relation

$$L^{(n)}_{\mathcal{O}}\Big|_{B_{2n-1}=B_{2n}=S_n} = S_n \prod_{i=1}^{n-1}(S_i^2 - S_n^2) \cdot L^{(n-1)}_{\mathcal{O}}(S_1,\cdots,S_{n-1}|B_1,\cdots,B$$

For the primary field:

$$L^{(n)}_{\Phi_\alpha}(S_1,\cdots,S_n) = \prod_{p=1}^{n} S_p \prod_{p>r}(S_p^2 - S_r^2)\,.$$

$L^{(n)}_{\mathcal{O}_\alpha}(S_1, \cdots, S_n | B_1, \cdots, B_{2n})$ is a Laurent polynomial such that

- anti-symmetric in S_j, symmetric in B_i
- recurrence relation

$$L^{(n)}_{\mathcal{O}}\Big|_{B_{2n-1}=B_{2n}=S_n} = S_n \prod_{i=1}^{n-1}(S_i^2 - S_n^2) \cdot L^{(n-1)}_{\mathcal{O}}(S_1, \cdots, S_{n-1} | B_1, \cdots, B$$

For the primary field:

$$L^{(n)}_{\Phi_\alpha}(S_1, \cdots, S_n) = \prod_{p=1}^{n} S_p \prod_{p>r}(S_p^2 - S_r^2)\,.$$

$L^{(n)}_{\mathcal{O}_\alpha}(S_1, \cdots, S_n | B_1, \cdots, B_{2n})$ is a Laurent polynomial such that

- anti-symmetric in S_j, symmetric in B_i
- recurrence relation

$$L^{(n)}_{\mathcal{O}}\Big|_{B_{2n-1}=B_{2n}=S_n} = S_n \prod_{i=1}^{n-1}(S_i^2 - S_n^2) \cdot L^{(n-1)}_{\mathcal{O}}(S_1, \cdots, S_{n-1} | B_1, \cdots, B$$

For the primary field:

$$L^{(n)}_{\Phi_\alpha}(S_1, \cdots, S_n) = \prod_{p=1}^{n} S_p \prod_{p>r}(S_p^2 - S_r^2) \,.$$

$L^{(n)}_{\mathcal{O}_\alpha}(S_1, \cdots, S_n | B_1, \cdots, B_{2n})$ is a Laurent polynomial such that

- anti-symmetric in S_j, symmetric in B_i
- recurrence relation

$$L^{(n)}_{\mathcal{O}}\Big|_{B_{2n-1}=B_{2n}=S_n} = S_n \prod_{i=1}^{n-1}(S_i^2 - S_n^2) \cdot L^{(n-1)}_{\mathcal{O}}(S_1, \cdots, S_{n-1}|B_1, \cdots, B$$

For the primary field:

$$L^{(n)}_{\Phi_\alpha}(S_1, \cdots, S_n) = \prod_{p=1}^{n} S_p \prod_{p>r}(S_p^2 - S_r^2)\,.$$

$L^{(n)}_{\mathcal{O}_\alpha}(S_1,\cdots,S_n|B_1,\cdots,B_{2n})$ is a Laurent polynomial such that

- anti-symmetric in S_j, symmetric in B_i
- recurrence relation

$$L^{(n)}_{\mathcal{O}}\Big|_{B_{2n-1}=B_{2n}=S_n} = S_n \prod_{i=1}^{n-1}(S_i^2 - S_n^2)\cdot L^{(n-1)}_{\mathcal{O}}(S_1,\cdots,S_{n-1}|B_1,\cdots,B$$

For the primary field:

$$L^{(n)}_{\Phi_\alpha}(S_1,\cdots,S_n) = \prod_{p=1}^{n} S_p \prod_{p>r}(S_p^2 - S_r^2)\,.$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k) \\ \times \bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)}.$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k)$$
$$\times\, \bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)}\,.$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k) \times \bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)}.$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k) \times \bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)}.$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k) \times \bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)}.$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k)$$
$$\times\, \bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)}\,.$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k) \times \bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)}.$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k) \\ \times \bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)} .$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k) \\ \times \bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)}.$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k)$$
$$\times\, \bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)}\,.$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k) \\ \times \bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)}\,.$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k)$$
$$\times\,\bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)}\,.$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k)$$
$$\times\,\bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)}\,.$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k)$$
$$\times\, \bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)}.$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k) \times \bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)}.$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k) \times \bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)}.$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k) \times \bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)}.$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k) \times \bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)}.$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k) \times \bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)}.$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k)$$
$$\times\, \bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)}\,.$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k) \times \bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)}\,.$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k)$$
$$\times\,\bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)}\,.$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k) \times \bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)}\,.$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k) \\ \times \bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)}.$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k) \times \bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)}.$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k) \times \bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)}\,.$$

It is possible to generate 'all' towers $\{L^{(n)}_{\mathcal{O}}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L^{(n)}_{\Phi_\alpha}\}$.

$$L^{(\star)}_{\mathcal{O}} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k) \times \bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L^{(\star)}_{\Phi_\alpha}\,.$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k) \times \bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)}.$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k) \times \bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)}.$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k) \times \bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)}.$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k) \times \bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)}.$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k)$$
$$\times\,\bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)}\,.$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k) \times \bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)}.$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k) \times \bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)}.$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k)$$
$$\times \bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)}.$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k) \times \bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)}.$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k)$$
$$\times\, \bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)}\,.$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k) \times \bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)} .$$

It is possible to generate 'all' towers $\{L^{(n)}_{\mathcal{O}}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L^{(n)}_{\Phi_\alpha}\}$.

$$L^{(\star)}_{\mathcal{O}} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k)$$
$$\times\, \bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L^{(\star)}_{\Phi_\alpha}\,.$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k) \times \bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)}.$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k) \\ \times \bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)}.$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k) \times \bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)}.$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k)$$
$$\times\, \bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)}\,.$$

Unexpectedly, we have found that, at the level of form factors, our fermions coincide with BBS fermions.

$$\mathcal{O} = \beta^*(\mu\zeta_1)\cdots\beta^*(\mu\zeta_p)\bar{\beta}^*(\zeta_{p+1}/\mu)\cdots\bar{\beta}^*(\zeta_k/\mu)$$
$$\times\, \bar{\gamma}^*(\xi_k/\mu)\cdots\bar{\gamma}^*(\xi_{q+1}/\mu)\gamma^*(\mu\xi_q)\cdots\gamma^*(\mu\xi_1)\Phi_\alpha\,.$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k) \times \bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)}\,.$$

Unexpectedly, we have found that, at the level of form factors, our fermions coincide with BBS fermions.

$$\mathcal{O} = \beta^*(\mu\zeta_1)\cdots\beta^*(\mu\zeta_p)\bar{\beta}^*(\zeta_{p+1}/\mu)\cdots\bar{\beta}^*(\zeta_k/\mu) \times \bar{\gamma}^*(\xi_k/\mu)\cdots\bar{\gamma}^*(\xi_{q+1}/\mu)\gamma^*(\mu\xi_q)\cdots\gamma^*(\mu\xi_1)\Phi_\alpha\,.$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k) \times \bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)} .$$

Unexpectedly, we have found that, at the level of form factors, our fermions coincide with BBS fermions.

$$\mathcal{O} = \beta^*(\mu\zeta_1)\cdots\beta^*(\mu\zeta_p)\bar{\beta}^*(\zeta_{p+1}/\mu)\cdots\bar{\beta}^*(\zeta_k/\mu) \times \bar{\gamma}^*(\xi_k/\mu)\cdots\bar{\gamma}^*(\xi_{q+1}/\mu)\gamma^*(\mu\xi_q)\cdots\gamma^*(\mu\xi_1)\Phi_\alpha .$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z),\quad \bar{\psi}^*(Z),\quad \chi^*(Z),\quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k) \times \bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)}\,.$$

Unexpectedly, we have found that, at the level of form factors, our fermions coincide with BBS fermions.

$$\mathcal{O} = \beta^*(\mu\zeta_1)\cdots\beta^*(\mu\zeta_p)\bar{\beta}^*(\zeta_{p+1}/\mu)\cdots\bar{\beta}^*(\zeta_k/\mu) \times \bar{\gamma}^*(\xi_k/\mu)\cdots\bar{\gamma}^*(\xi_{q+1}/\mu)\gamma^*(\mu\xi_q)\cdots\gamma^*(\mu\xi_1)\Phi_\alpha\,.$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k) \times \bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)} .$$

Unexpectedly, we have found that, at the level of form factors, our fermions coincide with BBS fermions.

$$\mathcal{O} = \beta^*(\mu\zeta_1)\cdots\beta^*(\mu\zeta_p)\bar{\beta}^*(\zeta_{p+1}/\mu)\cdots\bar{\beta}^*(\zeta_k/\mu) \times \bar{\gamma}^*(\xi_k/\mu)\cdots\bar{\gamma}^*(\xi_{q+1}/\mu)\gamma^*(\mu\xi_q)\cdots\gamma^*(\mu\xi_1)\Phi_\alpha .$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k) \times \bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)}\,.$$

Unexpectedly, we have found that, at the level of form factors, our fermions coincide with BBS fermions.

$$\mathcal{O} = \beta^*(\mu\zeta_1)\cdots\beta^*(\mu\zeta_p)\bar{\beta}^*(\zeta_{p+1}/\mu)\cdots\bar{\beta}^*(\zeta_k/\mu) \times \bar{\gamma}^*(\xi_k/\mu)\cdots\bar{\gamma}^*(\xi_{q+1}/\mu)\gamma^*(\mu\xi_q)\cdots\gamma^*(\mu\xi_1)\Phi_\alpha\,.$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k) \times \bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)}.$$

Unexpectedly, we have found that, at the level of form factors, our fermions coincide with BBS fermions.

$$\mathcal{O} = \beta^*(\mu\zeta_1)\cdots\beta^*(\mu\zeta_p)\bar{\beta}^*(\zeta_{p+1}/\mu)\cdots\bar{\beta}^*(\zeta_k/\mu) \times \bar{\gamma}^*(\xi_k/\mu)\cdots\bar{\gamma}^*(\xi_{q+1}/\mu)\gamma^*(\mu\xi_q)\cdots\gamma^*(\mu\xi_1)\Phi_\alpha.$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k) \times \bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)} .$$

Unexpectedly, we have found that, at the level of form factors, our fermions coincide with BBS fermions.

$$\mathcal{O} = \beta^*(\mu\zeta_1)\cdots\beta^*(\mu\zeta_p)\bar{\beta}^*(\zeta_{p+1}/\mu)\cdots\bar{\beta}^*(\zeta_k/\mu) \times \bar{\gamma}^*(\xi_k/\mu)\cdots\bar{\gamma}^*(\xi_{q+1}/\mu)\gamma^*(\mu\xi_q)\cdots\gamma^*(\mu\xi_1)\Phi_\alpha .$$

It is possible to generate 'all' towers $\{L^{(n)}_{\mathcal{O}}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L^{(n)}_{\Phi_\alpha}\}$.

$$L^{(\star)}_{\mathcal{O}} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k) \times \bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L^{(\star)}_{\Phi_\alpha}\,.$$

Unexpectedly, we have found that, at the level of form factors, our fermions coincide with BBS fermions.

$$\mathcal{O} = \beta^*(\mu\zeta_1)\cdots\beta^*(\mu\zeta_p)\bar{\beta}^*(\zeta_{p+1}/\mu)\cdots\bar{\beta}^*(\zeta_k/\mu) \times \bar{\gamma}^*(\xi_k/\mu)\cdots\bar{\gamma}^*(\xi_{q+1}/\mu)\gamma^*(\mu\xi_q)\cdots\gamma^*(\mu\xi_1)\Phi_\alpha\,.$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k) \times \bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)}\,.$$

Unexpectedly, we have found that, at the level of form factors, our fermions coincide with BBS fermions.

$$\mathcal{O} = \beta^*(\mu\zeta_1)\cdots\beta^*(\mu\zeta_p)\bar{\beta}^*(\zeta_{p+1}/\mu)\cdots\bar{\beta}^*(\zeta_k/\mu) \times \bar{\gamma}^*(\xi_k/\mu)\cdots\bar{\gamma}^*(\xi_{q+1}/\mu)\gamma^*(\mu\xi_q)\cdots\gamma^*(\mu\xi_1)\Phi_\alpha\,.$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k) \times \bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)}.$$

Unexpectedly, we have found that, at the level of form factors, our fermions coincide with BBS fermions.

$$\mathcal{O} = \beta^*(\mu\zeta_1)\cdots\beta^*(\mu\zeta_p)\bar{\beta}^*(\zeta_{p+1}/\mu)\cdots\bar{\beta}^*(\zeta_k/\mu) \times \bar{\gamma}^*(\xi_k/\mu)\cdots\bar{\gamma}^*(\xi_{q+1}/\mu)\gamma^*(\mu\xi_q)\cdots\gamma^*(\mu\xi_1)\Phi_\alpha.$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k) \times \bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)}.$$

Unexpectedly, we have found that, at the level of form factors, our fermions coincide with BBS fermions.

$$\mathcal{O} = \beta^*(\mu\zeta_1)\cdots\beta^*(\mu\zeta_p)\bar{\beta}^*(\zeta_{p+1}/\mu)\cdots\bar{\beta}^*(\zeta_k/\mu) \times \bar{\gamma}^*(\xi_k/\mu)\cdots\bar{\gamma}^*(\xi_{q+1}/\mu)\gamma^*(\mu\xi_q)\cdots\gamma^*(\mu\xi_1)\Phi_\alpha.$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k) \times \bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)} .$$

Unexpectedly, we have found that, at the level of form factors, our fermions coincide with BBS fermions.

$$\mathcal{O} = \beta^*(\mu\zeta_1)\cdots\beta^*(\mu\zeta_p)\bar{\beta}^*(\zeta_{p+1}/\mu)\cdots\bar{\beta}^*(\zeta_k/\mu) \times \bar{\gamma}^*(\xi_k/\mu)\cdots\bar{\gamma}^*(\xi_{q+1}/\mu)\gamma^*(\mu\xi_q)\cdots\gamma^*(\mu\xi_1)\Phi_\alpha .$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k) \times \bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)}\,.$$

Unexpectedly, we have found that, at the level of form factors, our fermions coincide with BBS fermions.

$$\mathcal{O} = \beta^*(\mu\zeta_1)\cdots\beta^*(\mu\zeta_p)\bar{\beta}^*(\zeta_{p+1}/\mu)\cdots\bar{\beta}^*(\zeta_k/\mu) \times \bar{\gamma}^*(\xi_k/\mu)\cdots\bar{\gamma}^*(\xi_{q+1}/\mu)\gamma^*(\mu\xi_q)\cdots\gamma^*(\mu\xi_1)\Phi_\alpha\,.$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k) \times \bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)} .$$

Unexpectedly, we have found that, at the level of form factors, our fermions coincide with BBS fermions.

$$\mathcal{O} = \beta^*(\mu\zeta_1)\cdots\beta^*(\mu\zeta_p)\bar{\beta}^*(\zeta_{p+1}/\mu)\cdots\bar{\beta}^*(\zeta_k/\mu) \times \bar{\gamma}^*(\xi_k/\mu)\cdots\bar{\gamma}^*(\xi_{q+1}/\mu)\gamma^*(\mu\xi_q)\cdots\gamma^*(\mu\xi_1)\Phi_\alpha .$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k)$$
$$\times\bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)}.$$

Unexpectedly, we have found that, at the level of form factors, our fermions coincide with BBS fermions.

$$\mathcal{O} = \beta^*(\mu\zeta_1)\cdots\beta^*(\mu\zeta_p)\bar{\beta}^*(\zeta_{p+1}/\mu)\cdots\bar{\beta}^*(\zeta_k/\mu)$$
$$\times\bar{\gamma}^*(\xi_k/\mu)\cdots\bar{\gamma}^*(\xi_{q+1}/\mu)\gamma^*(\mu\xi_q)\cdots\gamma^*(\mu\xi_1)\Phi_\alpha.$$

It is possible to generate 'all' towers $\{L_{\mathcal{O}}^{(n)}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L_{\Phi_\alpha}^{(n)}\}$.

$$L_{\mathcal{O}}^{(\star)} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k)$$
$$\times\bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L_{\Phi_\alpha}^{(\star)}.$$

Unexpectedly, we have found that, at the level of form factors, our fermions coincide with BBS fermions.

$$\mathcal{O} = \beta^*(\mu\zeta_1)\cdots\beta^*(\mu\zeta_p)\bar{\beta}^*(\zeta_{p+1}/\mu)\cdots\bar{\beta}^*(\zeta_k/\mu)$$
$$\times\bar{\gamma}^*(\xi_k/\mu)\cdots\bar{\gamma}^*(\xi_{q+1}/\mu)\gamma^*(\mu\xi_q)\cdots\gamma^*(\mu\xi_1)\Phi_\alpha.$$

It is possible to generate 'all' towers $\{L^{(n)}_{\mathcal{O}}\}$ by acting with certain fermions (Babelon-Bernard-Smirnov, 1997)

$$\psi^*(Z), \quad \bar{\psi}^*(Z), \quad \chi^*(Z), \quad \bar{\chi}^*(Z)$$

on the primary tower $\{L^{(n)}_{\Phi_\alpha}\}$.

$$L^{(\star)}_{\mathcal{O}} = \psi^*(Z_1)\cdots\psi^*(Z_p)\bar{\psi}^*(Z_{p+1})\cdots\bar{\psi}^*(Z_k)$$
$$\times\,\bar{\chi}^*(X_k)\cdots\bar{\chi}^*(X_{q+1})\chi^*(X_q)\cdots\chi^*(X_1)L^{(\star)}_{\Phi_\alpha}\,.$$

Unexpectedly, we have found that, at the level of form factors, our fermions coincide with BBS fermions.

$$\mathcal{O} = \beta^*(\mu\zeta_1)\cdots\beta^*(\mu\zeta_p)\bar{\beta}^*(\zeta_{p+1}/\mu)\cdots\bar{\beta}^*(\zeta_k/\mu)$$
$$\times\,\bar{\gamma}^*(\xi_k/\mu)\cdots\bar{\gamma}^*(\xi_{q+1}/\mu)\gamma^*(\mu\xi_q)\cdots\gamma^*(\mu\xi_1)\Phi_\alpha\,.$$

Summary

Summary

We have constructed a fermionic basis of local operators (conjecturally) with the properties:

Summary

We have constructed a fermionic basis of local operators (conjecturally) with the properties:

Summary

We have constructed a fermionic basis of local operators (conjecturally) with the properties:

- They are essentially the same for the lattice, CFT and massive QFT.

Summary

We have constructed a fermionic basis of local operators (conjecturally) with the properties:

- They are essentially the same for the lattice, CFT and massive QFT.

Summary

We have constructed a fermionic basis of local operators (conjecturally) with the properties:

- They are essentially the same for the lattice, CFT and massive QFT.

Summary

We have constructed a fermionic basis of local operators (conjecturally) with the properties:

- They are essentially the same for the lattice, CFT and massive QFT.

Summary

We have constructed a fermionic basis of local operators (conjecturally) with the properties:

- They are essentially the same for the lattice, CFT and massive QFT.

Summary

We have constructed a fermionic basis of local operators (conjecturally) with the properties:

- They are essentially the same for the lattice, CFT and massive QFT.

Summary

We have constructed a fermionic basis of local operators (conjecturally) with the properties:

- They are essentially the same for the lattice, CFT and massive QFT.

Summary

We have constructed a fermionic basis of local operators (conjecturally) with the properties:

- They are essentially the same for the lattice, CFT and massive QFT.

Summary

We have constructed a fermionic basis of local operators (conjecturally) with the properties:

- They are essentially the same for the lattice, CFT and massive QFT.

Summary

We have constructed a fermionic basis of local operators (conjecturally) with the properties:

- They are essentially the same for the lattice, CFT and massive QFT.

Summary

We have constructed a fermionic basis of local operators (conjecturally) with the properties:

- They are essentially the same for the lattice, CFT and massive QFT.

Summary

We have constructed a fermionic basis of local operators (conjecturally) with the properties:

- They are essentially the same for the lattice, CFT and massive QFT.
- They have very simple form of VEVs.

Summary

We have constructed a fermionic basis of local operators (conjecturally) with the properties:

- They are essentially the same for the lattice, CFT and massive QFT.
- They have very simple form of VEVs.

Summary

We have constructed a fermionic basis of local operators (conjecturally) with the properties:

- They are essentially the same for the lattice, CFT and massive QFT.
- They have very simple form of VEVs.

Summary

We have constructed a fermionic basis of local operators (conjecturally) with the properties:

- They are essentially the same for the lattice, CFT and massive QFT.
- They have very simple form of VEVs.

Summary

We have constructed a fermionic basis of local operators (conjecturally) with the properties:

- They are essentially the same for the lattice, CFT and massive QFT.
- They have very simple form of VEVs.

Summary

We have constructed a fermionic basis of local operators (conjecturally) with the properties:

- They are essentially the same for the lattice, CFT and massive QFT.
- They have very simple form of VEVs.

Summary

We have constructed a fermionic basis of local operators (conjecturally) with the properties:

- They are essentially the same for the lattice, CFT and massive QFT.
- They have very simple form of VEVs.
- They reproduce the fermionic construction of form factors.

Summary

We have constructed a fermionic basis of local operators (conjecturally) with the properties:

- They are essentially the same for the lattice, CFT and massive QFT.
- They have very simple form of VEVs.
- They reproduce the fermionic construction of form factors.

Summary

We have constructed a fermionic basis of local operators (conjecturally) with the properties:

- They are essentially the same for the lattice, CFT and massive QFT.
- They have very simple form of VEVs.
- They reproduce the fermionic construction of form factors.

Summary

We have constructed a fermionic basis of local operators (conjecturally) with the properties:

- They are essentially the same for the lattice, CFT and massive QFT.
- They have very simple form of VEVs.
- They reproduce the fermionic construction of form factors.

Summary

We have constructed a fermionic basis of local operators (conjecturally) with the properties:

- They are essentially the same for the lattice, CFT and massive QFT.
- They have very simple form of VEVs.
- They reproduce the fermionic construction of form factors.

Summary

We have constructed a fermionic basis of local operators (conjecturally) with the properties:

- They are essentially the same for the lattice, CFT and massive QFT.
- They have very simple form of VEVs.
- They reproduce the fermionic construction of form factors.

Summary

We have constructed a fermionic basis of local operators (conjecturally) with the properties:

- They are essentially the same for the lattice, CFT and massive QFT.
- They have very simple form of VEVs.
- They reproduce the fermionic construction of form factors.

Summary

We have constructed a fermionic basis of local operators (conjecturally) with the properties:

- They are essentially the same for the lattice, CFT and massive QFT.
- They have very simple form of VEVs.
- They reproduce the fermionic construction of form factors.

Summary

We have constructed a fermionic basis of local operators (conjecturally) with the properties:

- They are essentially the same for the lattice, CFT and massive QFT.
- They have very simple form of VEVs.
- They reproduce the fermionic construction of form factors.

Summary

We have constructed a fermionic basis of local operators (conjecturally) with the properties:

- They are essentially the same for the lattice, CFT and massive QFT.
- They have very simple form of VEVs.
- They reproduce the fermionic construction of form factors.

THANK YOU VERY MUCH FOR YOUR ATTENTION