

Title: Closing Remarks

Speakers:

Collection: 50 Years of Horndeski Gravity: Exploring Modified Gravity

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Concluding Remarks

50 YEARS OF HORNDENSKI GRAVITY:

Exploring Modified Gravity

Perimeter Institute and University of Waterloo
July 15-19, 2024



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FACULTY OF MATHEMATICS
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(Intellectual) Land Acknowledgement



Second-Order Scalar-Tensor Field Equations in a Four-Dimensional Space

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Abstract

Lagrange scalar densities which are concomitants of a pseudo-Riemannian metric-tensor, a scalar field and their derivatives of arbitrary order are considered. The most general second-order Euler-Lagrange tensors derivable from such a Lagrangian in a four-dimensional space are constructed, and it is shown that these Euler-Lagrange tensors may be obtained from a Lagrangian which is at most of second order in the derivatives of the field functions.

1. Introduction

Our considerations will be based upon a real, four-dimensional, C^∞ differentiable manifold M . It will be assumed that all field functions are defined globally; however, our work will be of a purely local nature. By a pseudo-Riemannian metric for M we shall mean a C^∞ symmetric $(0, 2)$ tensor field on M which associates a non-degenerate, symmetric bilinear form to each fibre of the tangent bundle of M . If $x (=x^i)$ is a chart for M the components of the metric will be denoted by g_{ij} , where Latin indices run from 1 to 4. The coefficients of the Christoffel connection determined by g_{ij} are †

$$\Gamma_{jk}^i = \frac{1}{2} g^{ih} (g_{jh,k} + g_{kh,j} - g_{jk,h})$$

where g^{ih} is the matrix inverse of g_{ij} and an index k (say) preceded by a comma denotes a partial derivative with respect to the local coordinate x^k . If Y^i denotes the components of an arbitrary vector field of class C^2 then the components, $R_h^i{}_{jk}$, of the Riemann-Christoffel curvature tensor are defined by

$$Y^i{}_{|jk} - Y^i{}_{|kj} = Y^h R_h^i{}_{jk}$$

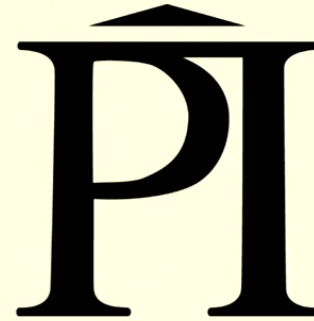
Last Words

- We acknowledge that the path we walk now was trodden before us
- We should inherit and respect the past, and use its lessons for the future
- Lessons from Horndeski: Academia/Life not just cut-throat competition
- There are wonders, surprises, arts, industry, discoveries, and sleeping beauties
- Your career doesn't define you. Adventures lie ahead!



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- *Beyond Horndeski, DH Θ ST,* \Rightarrow **Super-Horndeski**





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Finally, let's hear from the man himself!

