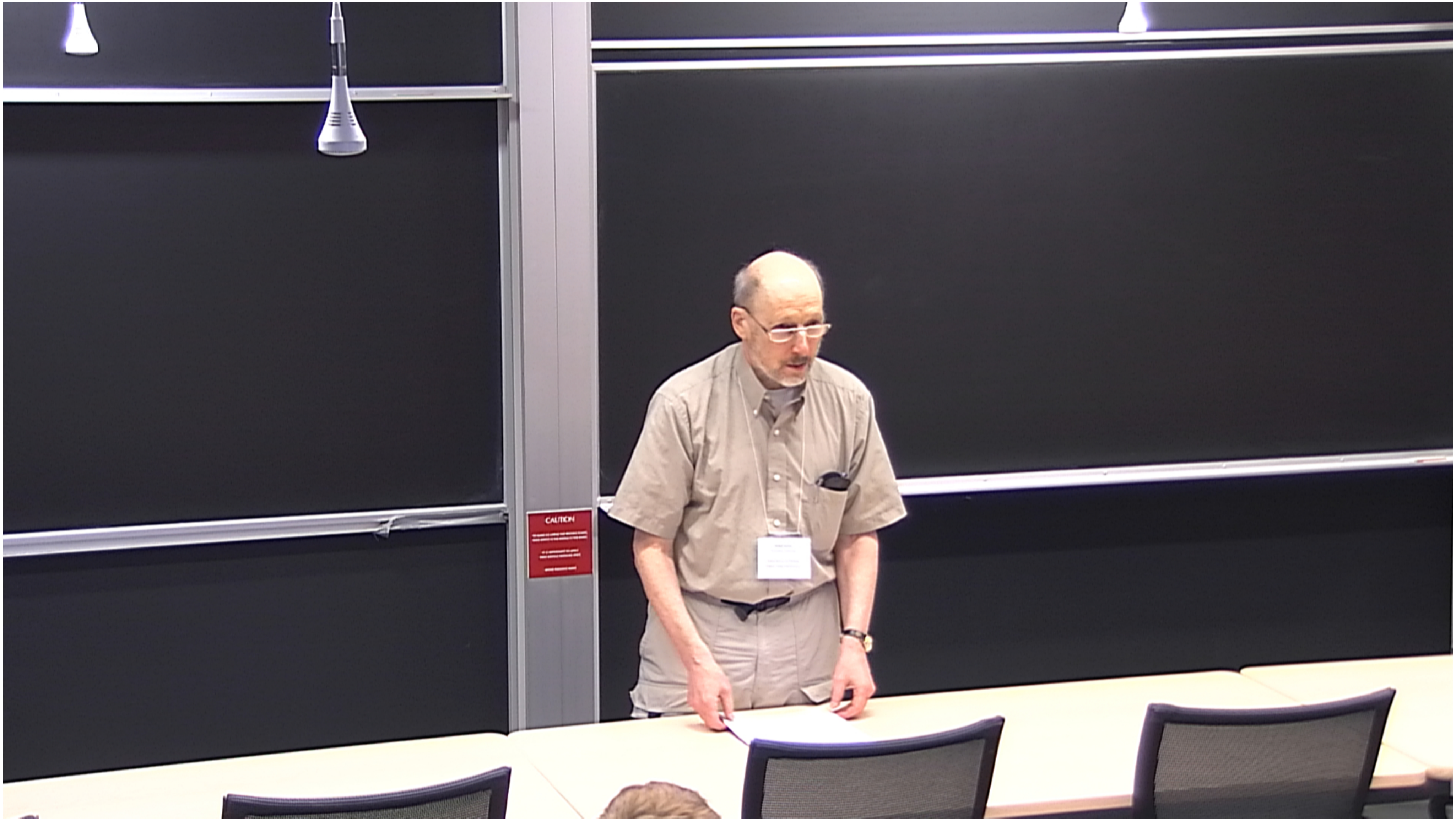
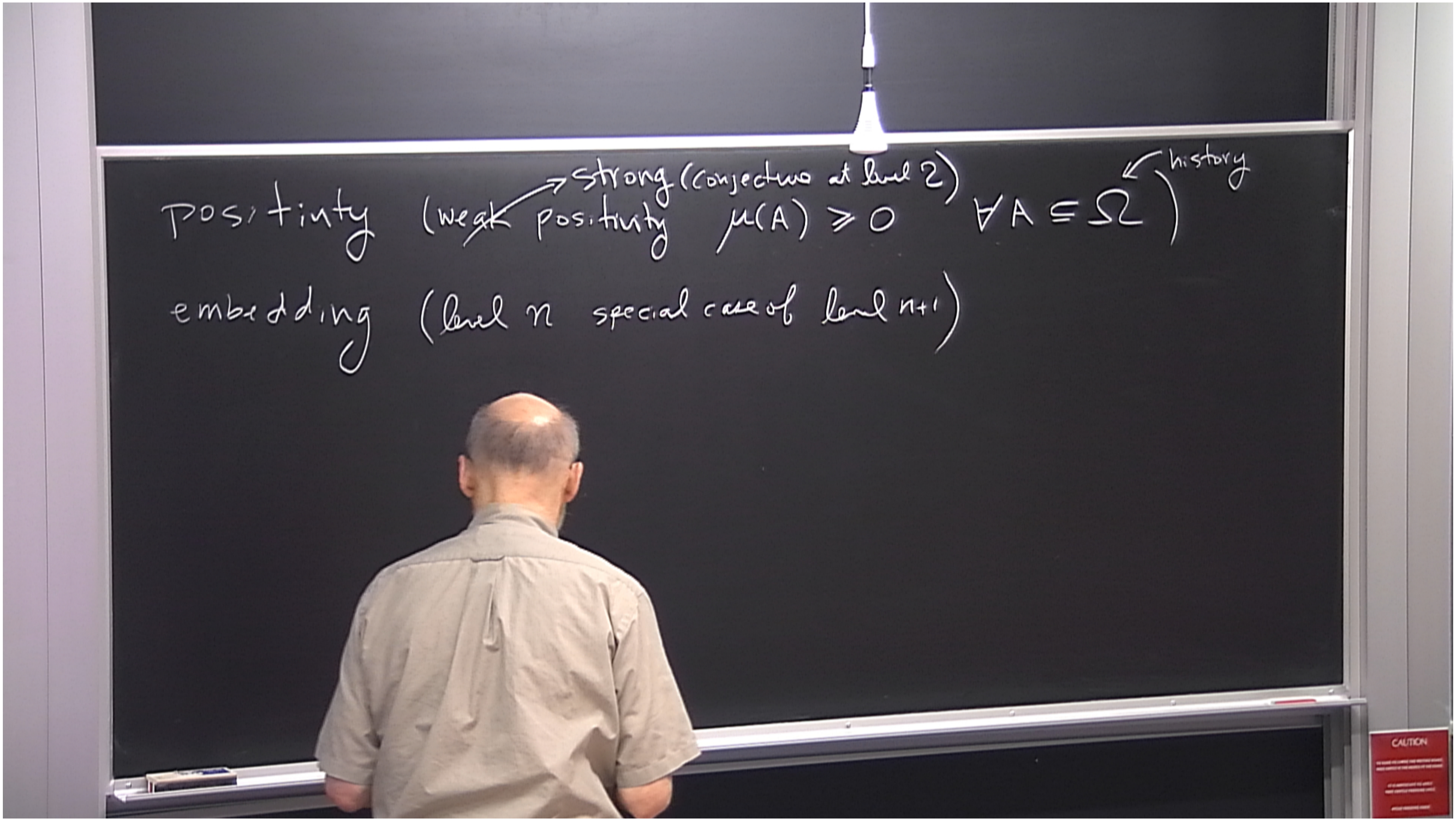
Title: Opening Remarks

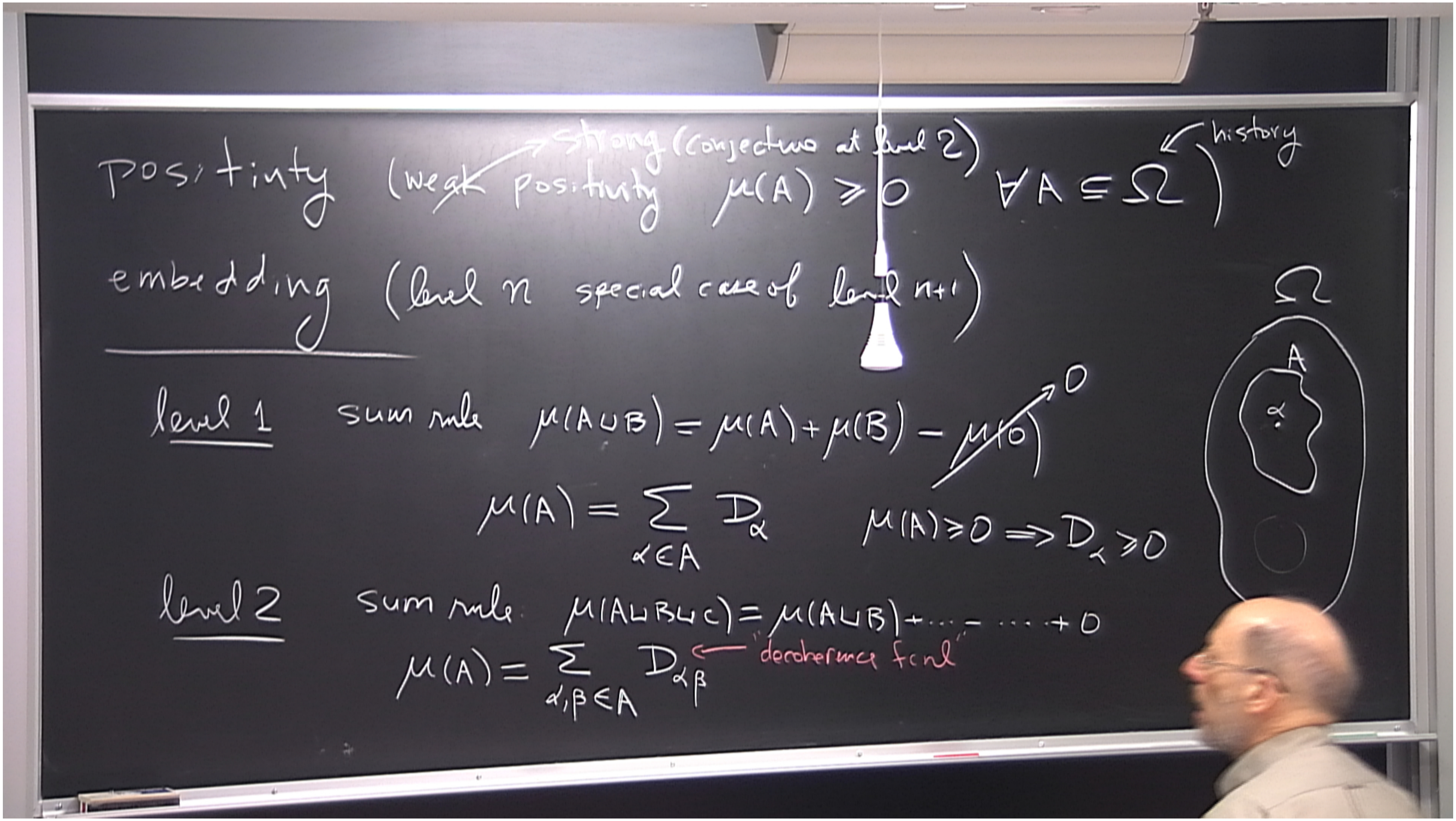
Date: Aug 03, 2016 10:00 AM

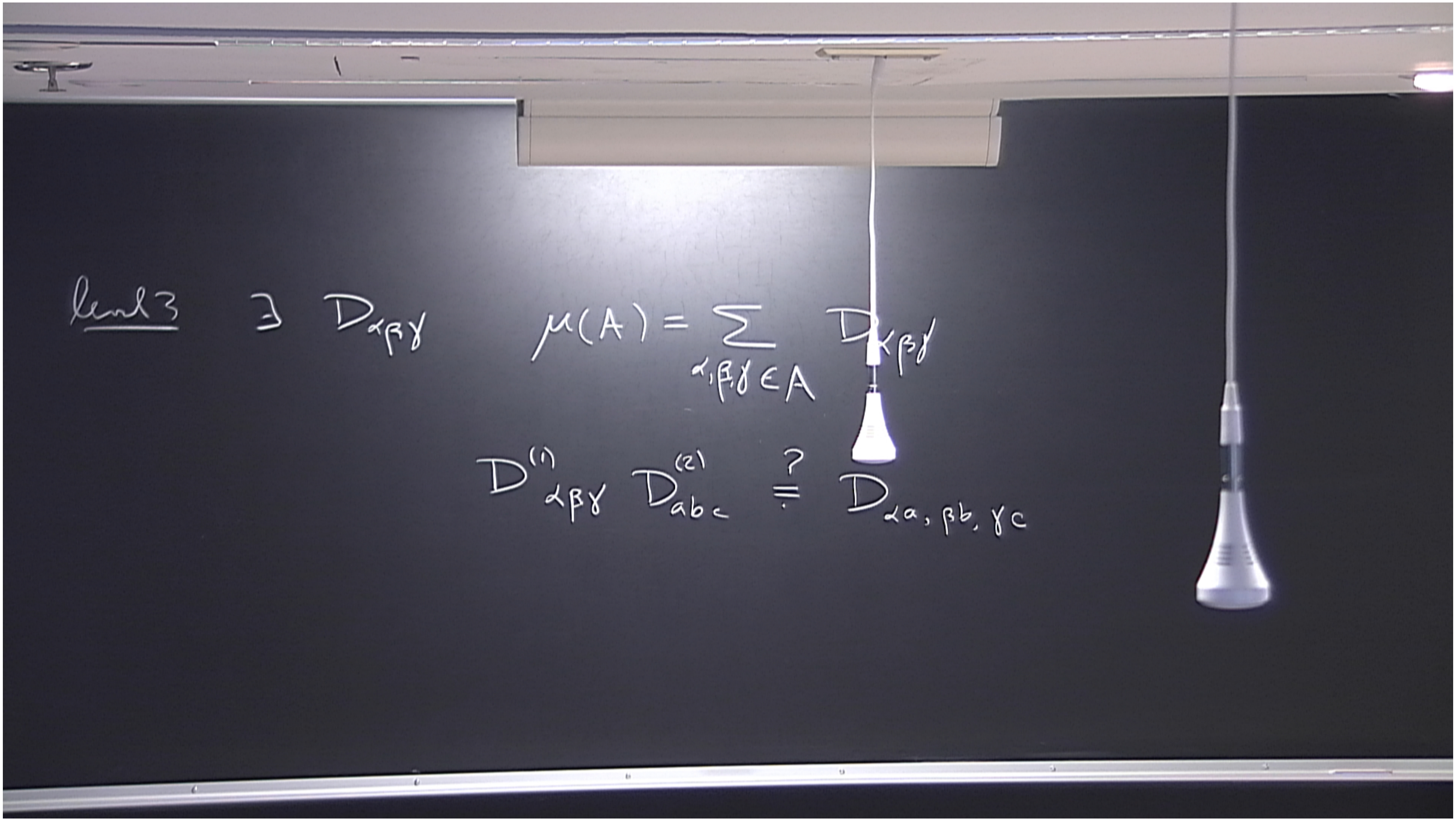
URL: http://pirsa.org/16080022

Abstract:


CAUTION


strong (conjecture at level 2)
history
positivity (weak positivity μ(A) ≥ 0 ∀A ⊆ Ω)
embedding (level n special case of level n+1)


positivity (~~weak~~ strong (conjecture at level 2) positivity $\mu(A) \geq 0$ $\forall A \subseteq \Omega$) history
embedding (level n special case of level $n+1$)
level 1 sum rule $\mu(A \sqcup B) = \mu(A) + \mu(B) - \cancel{\mu(\emptyset)} \to 0$
$\mu(A) = \sum_{\alpha \in A} D_\alpha$ $\mu(A) \geq 0 \Rightarrow D_\alpha \geq 0$
level 2 sum rule $\mu(A \sqcup B \sqcup C) = \mu(A \sqcup B) + \dots - \dots + 0$
$\mu(A) = \sum_{\alpha, \beta \in A} D_{\alpha\beta}$ ← "decoherence fcnl"
Ω
A
α


level 3 $\exists\ D_{\alpha\beta\gamma}$
$\mu(A) = \sum_{\alpha,\beta,\gamma \in A} D_{\alpha\beta\gamma}$
$D^{(1)}_{\alpha\beta\gamma} D^{(2)}_{abc} \stackrel{?}{=} D_{\alpha a, \beta b, \gamma c}$

Conjecture

(composition of subsystems)

① closed under $\otimes$ $\qquad D^{(1)}_{\alpha\beta}\ D^{(2)}_{ab} = D_{\alpha a, \beta b}$

② "Galois self-dual"

$W(\Omega)$ = weakly positive D on Ω

$S \subseteq W$, $S' = \{D' \in W \mid (\forall D \in S)\ D \otimes D' \in W\}$

Thm S = strong pos. then ① holds, ② $S' = S$

Is S the unique such? Does it generalize to levels 3, 4, ... ?

positivity (~~weak~~ strong (conjecture at level 2) positivity $\mu(A) \geq 0 \quad \forall A \subseteq \Omega$) history

embedding (level n special case of level $n+1$)

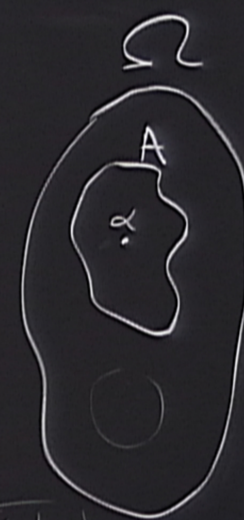
(level $n+1$ pos $\Longrightarrow$ level n pos)

level 1 sum rule $\mu(A \sqcup B) = \mu(A) + \mu(B) - \cancelto{0}{\mu(\emptyset)}$

$$\mu(A) = \sum_{\alpha \in A} D_\alpha \qquad \mu(A) \geq 0 \Longrightarrow D_\alpha \geq 0$$

level 2 sum rule $\mu(A \sqcup B \sqcup C) = \mu(A \sqcup B) + \dots - \dots + 0$

$$\boxed{\mu(A) = \sum_{\alpha, \beta \in A} D_{\alpha\beta}} \leftarrow \text{"decoherence fcnl"}$$



W?

$\underline{\text{QM}}$ $\quad D_{\alpha\beta} \in \mathbb{C} \quad D^\dagger = D \quad D \geq 0$ ← strong positivity (pos. semi-definite)

$\underline{\text{level}} \geq 3$ we know Σ rule

$\mu(O) \geq 0$

$O \sqcup O = O$

$\underline{\text{level } 0}$ $\quad \mu(A) = \mu(0)$ $\qquad \mu(O) = \mu(O) + \cancel{\mu(O)} - \cancel{\mu(O)}$