RODOLFO GUIDOBONO - CURSO TEORÍA CUÁNTICA DE CAMPOS

JAVIER GARCÍA - EJERCICIO CAP. 35 10/2/20

Demostrar que $e^{\theta/2\, m_0 m_1} \cdot m_1 \cdot e^{-\theta/2\, m_0 m_1} = -\operatorname{senh}\theta \cdot m_0 + \cosh\theta \cdot m_1$

$$\begin{cases} m_0^2 = 1 \\ m_1^2 = -1 \\ m_0 \cdot m_1 = -m_1 m_0 \end{cases} \qquad \begin{cases} e^{\theta m_0 m_1} = \cosh\theta + m_0 m_1 \operatorname{senh}\theta \\ e^{-\theta m_0 m_1} = \cosh\theta - m_0 m_1 \operatorname{senh}\theta \end{cases}$$

$$e^{\theta m_0 m_1} \cdot m_1 = \operatorname{ch}\theta\, m_1 + \operatorname{sh}\theta\, m_0 m_1 m_1 = \operatorname{ch}\theta\, m_1 - \operatorname{sh}\theta\, m_0$$

$$\left(e^{\theta m_0 m_1} \cdot m_1\right) e^{-\theta m_0 m_1} = \left(\operatorname{ch}\theta\, m_1 - \operatorname{sh}\theta\, m_0\right)\left(\cosh\theta - m_0 m_1 \operatorname{sh}\theta\right) =$$

$$= \operatorname{ch}^2\theta\, m_1 - \operatorname{sh}\theta \operatorname{ch}\theta \underbrace{m_1 m_0 m_1}_{= -m_1 m_1 m_0 = m_0} - \operatorname{sh}\theta \operatorname{ch}\theta\, m_0 + \operatorname{sh}^2\theta \underbrace{m_0 m_0}_{=1} m_1$$

$$= \operatorname{ch}^2\theta\, m_1 - \operatorname{sh}\theta \operatorname{ch}\theta\, m_0 - \operatorname{sh}\theta \operatorname{ch}\theta\, m_0 + \operatorname{sh}^2\theta\, m_1$$

$$= \underbrace{\left(\cosh^2\theta + \operatorname{senh}^2\theta\right)}_{\cosh 2\theta} m_1 - \underbrace{2 \operatorname{senh}\theta \cosh\theta}_{\operatorname{senh} 2\theta}\, m_0$$

$$e^{\theta m_0 m_1} \cdot m_1 \cdot e^{-\theta m_0 m_1} = -\operatorname{senh} 2\theta\, m_0 + \cosh 2\theta\, m_1$$

$\downarrow \theta \rightarrow \theta/2$

$$e^{\theta/2\, m_0 m_1} \cdot m_1 \cdot e^{-\theta/2\, m_0 m_1} = -\operatorname{senh}\theta\, m_0 + \cosh\theta\, m_1 \qquad \text{Q.E.D.}$$