

$$S[\Lambda] \begin{pmatrix} 1 \\ 0 \\ 0 \\ 0 \end{pmatrix} = \begin{pmatrix} ch \eta/2 \\ sh \eta/2 \end{pmatrix} \otimes \begin{pmatrix} e^{-i\phi/2} \cos \frac{\theta}{2} & 0 \\ e^{i\phi/2} \sin \frac{\theta}{2} & \sin \frac{\theta}{2} \end{pmatrix} \quad S[\Lambda] \begin{pmatrix} 0 \\ 0 \\ 0 \\ 1 \end{pmatrix} = \begin{pmatrix} ch \eta/2 \\ sh \eta/2 \end{pmatrix} \otimes \begin{pmatrix} e^{-i\phi/2} \cos \frac{\theta}{2} & 0 \\ e^{i\phi/2} \sin \frac{\theta}{2} & \sin \frac{\theta}{2} \end{pmatrix}$$

EJERCICIO

$$S[\Lambda] \begin{pmatrix} 0 \\ 1 \\ 0 \\ 0 \end{pmatrix} = \begin{pmatrix} ch \eta/2 \\ -sh \eta/2 \end{pmatrix} \otimes \begin{pmatrix} -e^{-i\phi/2} \sin \frac{\theta}{2} & \sin \frac{\theta}{2} \\ e^{i\phi/2} \cos \frac{\theta}{2} & \cos \frac{\theta}{2} \end{pmatrix} \quad S[\Lambda] \begin{pmatrix} 0 \\ 0 \\ 0 \\ 1 \end{pmatrix} = \begin{pmatrix} -sh \eta/2 \\ ch \eta/2 \end{pmatrix} \otimes \begin{pmatrix} -e^{-i\phi/2} \sin \frac{\theta}{2} & \sin \frac{\theta}{2} \\ e^{i\phi/2} \cos \frac{\theta}{2} & \cos \frac{\theta}{2} \end{pmatrix}$$

Se nos pide demostrar las ultimas tres igualdades.

Partimos de

$$S[\Lambda] = \begin{pmatrix} ch \frac{\eta}{2} & 0 \\ 0 & ch \frac{\eta}{2} \end{pmatrix} \otimes \begin{pmatrix} e^{-i\phi/2} \cos \frac{\theta}{2} & -e^{-i\phi/2} \sin \frac{\theta}{2} \\ e^{i\phi/2} \sin \frac{\theta}{2} & e^{i\phi/2} \cos \frac{\theta}{2} \end{pmatrix} + \begin{pmatrix} 0 & sh \frac{\eta}{2} \\ sh \frac{\eta}{2} & 0 \end{pmatrix} \otimes \begin{pmatrix} e^{-i\phi/2} \cos \frac{\theta}{2} & e^{-i\phi/2} \sin \frac{\theta}{2} \\ e^{i\phi/2} \sin \frac{\theta}{2} & -e^{i\phi/2} \cos \frac{\theta}{2} \end{pmatrix}$$

Segunda igualdad

$$S[\Lambda] \begin{pmatrix} 0 \\ 1 \\ 0 \\ 0 \end{pmatrix} = S[\Lambda] \left(\begin{pmatrix} 1 \\ 0 \end{pmatrix} \otimes \begin{pmatrix} 0 \\ 1 \end{pmatrix} \right) = \begin{pmatrix} ch \frac{\eta}{2} \\ 0 \end{pmatrix} \otimes \begin{pmatrix} -e^{-i\phi/2} \sin \frac{\theta}{2} \\ e^{i\phi/2} \cos \frac{\theta}{2} \end{pmatrix} + \begin{pmatrix} 0 \\ sh \frac{\eta}{2} \end{pmatrix} \otimes \begin{pmatrix} e^{-i\phi/2} \sin \frac{\theta}{2} \\ -e^{i\phi/2} \cos \frac{\theta}{2} \end{pmatrix}$$

$$S[\Lambda] \begin{pmatrix} 0 \\ 1 \\ 0 \\ 0 \end{pmatrix} = \begin{pmatrix} ch \frac{\eta}{2} \\ 0 \end{pmatrix} \otimes \begin{pmatrix} -e^{-i\phi/2} \sin \frac{\theta}{2} \\ e^{i\phi/2} \cos \frac{\theta}{2} \end{pmatrix} + \begin{pmatrix} 0 \\ sh \frac{\eta}{2} \end{pmatrix} \otimes - \begin{pmatrix} -e^{-i\phi/2} \sin \frac{\theta}{2} \\ e^{i\phi/2} \cos \frac{\theta}{2} \end{pmatrix}$$

$$S[\Lambda] \begin{pmatrix} 0 \\ 1 \\ 0 \\ 0 \end{pmatrix} = \begin{pmatrix} ch \frac{\eta}{2} \\ -sh \frac{\eta}{2} \end{pmatrix} \otimes \begin{pmatrix} -e^{-i\phi/2} \sin \frac{\theta}{2} \\ e^{i\phi/2} \cos \frac{\theta}{2} \end{pmatrix}$$

Tercera igualdad

$$S[\Lambda] \begin{pmatrix} 0 \\ 0 \\ 1 \\ 0 \end{pmatrix} = S[\Lambda] \left(\begin{pmatrix} 0 \\ 1 \end{pmatrix} \otimes \begin{pmatrix} 1 \\ 0 \end{pmatrix} \right) = \begin{pmatrix} 0 \\ ch \frac{\eta}{2} \end{pmatrix} \otimes \begin{pmatrix} e^{-i\phi/2} \sin \frac{\theta}{2} \\ e^{i\phi/2} \cos \frac{\theta}{2} \end{pmatrix} + \begin{pmatrix} sh \frac{\eta}{2} \\ 0 \end{pmatrix} \otimes \begin{pmatrix} e^{-i\phi/2} \sin \frac{\theta}{2} \\ e^{i\phi/2} \cos \frac{\theta}{2} \end{pmatrix}$$

$$S[\Lambda] \begin{pmatrix} 0 \\ 0 \\ 1 \\ 0 \end{pmatrix} = \begin{pmatrix} sh \frac{\eta}{2} \\ ch \frac{\eta}{2} \end{pmatrix} \otimes \begin{pmatrix} e^{-i\phi/2} \sin \frac{\theta}{2} \\ e^{i\phi/2} \cos \frac{\theta}{2} \end{pmatrix}$$

Cuarta igualdad

$$S[\Lambda] \begin{pmatrix} 0 \\ 0 \\ 0 \\ 1 \end{pmatrix} = S[\Lambda] \left(\begin{pmatrix} 0 \\ 1 \end{pmatrix} \otimes \begin{pmatrix} 0 \\ 1 \end{pmatrix} \right) = \begin{pmatrix} 0 \\ ch \frac{\eta}{2} \end{pmatrix} \otimes \begin{pmatrix} -e^{-i\phi/2} \sin \frac{\theta}{2} \\ e^{i\phi/2} \cos \frac{\theta}{2} \end{pmatrix} + \begin{pmatrix} sh \frac{\eta}{2} \\ 0 \end{pmatrix} \otimes \begin{pmatrix} e^{-i\phi/2} \sin \frac{\theta}{2} \\ -e^{i\phi/2} \cos \frac{\theta}{2} \end{pmatrix} S[\Lambda] \begin{pmatrix} 0 \\ 0 \\ 0 \\ 1 \end{pmatrix} =$$

$$\begin{pmatrix} 0 \\ ch \frac{\eta}{2} \end{pmatrix} \otimes \begin{pmatrix} -e^{-i\phi/2} \sin \frac{\theta}{2} \\ e^{i\phi/2} \cos \frac{\theta}{2} \end{pmatrix} + \begin{pmatrix} sh \frac{\eta}{2} \\ 0 \end{pmatrix} \otimes - \begin{pmatrix} -e^{-i\phi/2} \sin \frac{\theta}{2} \\ e^{i\phi/2} \cos \frac{\theta}{2} \end{pmatrix}$$

$$S[\Lambda] \begin{pmatrix} 0 \\ 0 \\ 0 \\ 1 \end{pmatrix} = \begin{pmatrix} -sh \frac{\eta}{2} \\ ch \frac{\eta}{2} \end{pmatrix} \otimes \begin{pmatrix} -e^{-i\phi/2} \sin \frac{\theta}{2} \\ e^{i\phi/2} \cos \frac{\theta}{2} \end{pmatrix}$$