

$$A \cdot B = \begin{pmatrix} \alpha & \beta \\ -\beta & \alpha \end{pmatrix} \begin{pmatrix} \gamma & \delta \\ -\delta & \gamma \end{pmatrix}$$

$$= \begin{pmatrix} \alpha\gamma - \beta\delta & \alpha\delta + \beta\gamma \\ -\beta\gamma - \alpha\delta & -\beta\delta + \alpha\gamma \end{pmatrix}$$

$$B \cdot A = \begin{pmatrix} \gamma & \delta \\ -\delta & \gamma \end{pmatrix} \begin{pmatrix} \alpha & \beta \\ -\beta & \alpha \end{pmatrix}$$

$$= \begin{pmatrix} \alpha\gamma - \beta\delta & \beta\gamma + \alpha\delta \\ -\alpha\delta - \beta\gamma & -\beta\delta + \alpha\gamma \end{pmatrix}$$

Vu que $\alpha\delta + \beta\gamma = \beta\gamma + \alpha\delta$

et que $-\beta\gamma - \alpha\delta = -\alpha\delta - \beta\gamma$, on a $A \cdot B = B \cdot A$