Zayra Gutierrez

4.5.2

$|\uparrow\rangle = \begin{bmatrix}1\\0\end{bmatrix}$ $|\downarrow\rangle = \begin{bmatrix}0\\1\end{bmatrix}$ $|\psi_1\rangle = c_{10}|\uparrow\rangle + c_{11}|\downarrow\rangle = \begin{bmatrix}c_{10}\\c_{11}\end{bmatrix} \rightarrow \in \mathbb{C}^2$

$|\psi_2\rangle = c_{20}|\uparrow\rangle + c_{21}|\downarrow\rangle = \begin{bmatrix}c_{20}\\c_{21}\end{bmatrix} \Rightarrow \in \mathbb{C}^2$

$|\psi_1\rangle \otimes |\psi_2\rangle = \begin{bmatrix}c_{10}c_{20}\\c_{10}c_{21}\\c_{11}c_{20}\\c_{11}c_{21}\end{bmatrix} \in \mathbb{C}^4$

$= c_{10}c_{20}|\uparrow\rangle \otimes |\uparrow\rangle + c_{10}c_{21}|\uparrow\rangle \otimes |\downarrow\rangle + c_{11}c_{20}|\downarrow\rangle \otimes |\uparrow\rangle + c_{11}c_{21}|\downarrow\rangle \otimes |\downarrow\rangle$

Es un vector de estado generico el cual pertenece a $\mathbb{C}^{2^n}$

4.5.3

$|\phi\rangle = |x_0\rangle \otimes |y_1\rangle + |x_1\rangle \otimes |y_1\rangle$

$|\psi_1\rangle = c_0|x_0\rangle + c_1|x_1\rangle = \begin{bmatrix}c_0\\c_1\end{bmatrix}$

$|\psi_2\rangle = c_0'|y_0\rangle + c_1'|y_1\rangle = \begin{bmatrix}c_0'\\c_1'\end{bmatrix}$

$|\phi\rangle = c_0c_0'|x_0\rangle \otimes |y_0\rangle + c_0c_1'|x_0\rangle \otimes |y_1\rangle + c_1c_0'|x_1\rangle \otimes |y_0\rangle + c_1c_1'|x_1\rangle \otimes |y_1\rangle$

$\left.\begin{array}{l} c_0c_0' = 0 \\ c_0c_1' = 1 \\ c_1c_0' = 0 \\ c_1c_1' = 1 \end{array}\right\} \begin{array}{l} c_0' = 0 \\ c_0 = 1 \\ c_1 = 1 \\ c_1' = 1 \end{array}$

El sistema si es separable.

$|\psi_1\rangle = |x_0\rangle + |x_1\rangle = \begin{bmatrix}1\\1\end{bmatrix}$ $|\psi_2\rangle = |y_1\rangle = \begin{bmatrix}0\\1\end{bmatrix}$