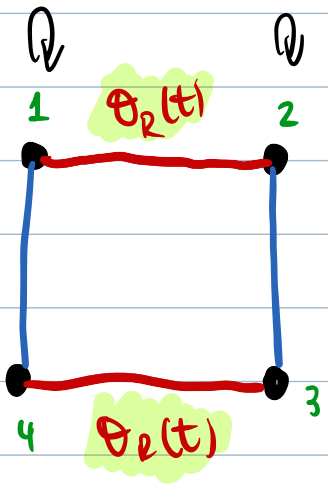


$$|\Psi(t)\rangle = U^t |\Psi(0)\rangle$$

$$U = e^{i\theta_R H_R} \quad e^{i\theta_B H_B}$$

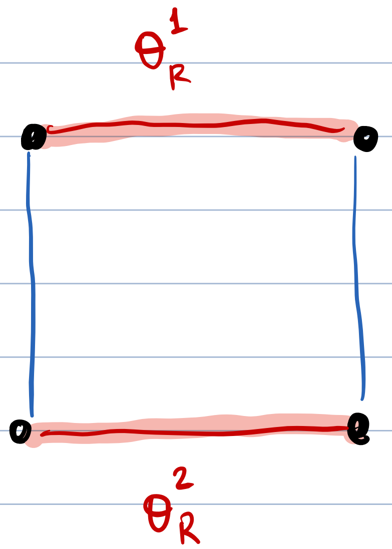
$$U^t = \left[e^{i\theta_R H_R} \quad e^{i\theta_B H_B} \right]^t$$

$$\tilde{U}^t = \left[e^{i\theta_R(t) H_R} \quad e^{i\theta_B(t) H_B} \right]^t$$

$$H_R = V_R^\dagger D_R V_R$$

$$\left[e^{i\theta_R(t)} V_R^\dagger D_R V_R \quad e^{i\theta_B(t)} V_B^\dagger D_B V_B \right]^t$$

$$\theta H_R = \begin{bmatrix} \theta \begin{bmatrix} 11 & 12 \\ 21 & 22 \end{bmatrix} & \\ & \theta \begin{bmatrix} 33 & 34 \\ 43 & 44 \end{bmatrix} \end{bmatrix}$$



$$U^t = e^{i\theta H_R} \quad e^{i\theta H_B}$$

$$\tilde{H}_R = \begin{bmatrix} \boxed{\theta_R^1} & \\ & \boxed{\theta_R^2} \end{bmatrix}$$

$$\tilde{H}_R \xrightarrow{\text{expm}}$$

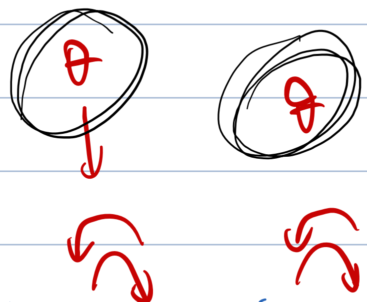
$2|\psi\rangle\langle\psi| - I$

$$\frac{1}{\sqrt{2}}\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$$

$$\frac{2}{2}\begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix} - I$$

$$\begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix} - \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

$$\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$$



$$T_R = [[1,2],[3,4]]$$

$$\theta^1 \qquad \theta^2$$

$$T_B = [[2,3],[1,4]]$$

$$H_R = \begin{bmatrix} \boxed{\begin{matrix} & \boxed{1} \\ \boxed{1} & \end{matrix}}_{\theta_R^1} & \\ & \boxed{\begin{matrix} & \boxed{1} \\ \boxed{1} & \end{matrix}}_{\theta_R^2} \end{bmatrix}$$

$$e^{-i} H_B = \begin{array}{c|cccc} & 1 & 2 & 3 & 4 \\ \hline 1 & 1 & & & \boxed{1} \\ 2 & & & \boxed{1} & \\ 3 & & \boxed{1} & & \\ 4 & \boxed{1} & & & \end{array}$$

θ_B^1 θ_B^2

$$U = \prod_{j=1}^{M} e^{iH_j(\underline{\theta, t})}$$