$$\text{SWAP} = \begin{pmatrix} 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 \end{pmatrix} =$$  .

$$U_k = \begin{pmatrix} e^{2\pi 2^{-k}} & 0 \\ 0 & e^{-2\pi 2^{-k}} \end{pmatrix}$$

$$A = \int d\Theta \, dr r^2 \sin(\theta)$$

$$\mathcal{L}G\left(\mathbf{x}, \xi\right) + \delta\left(\mathbf{x} - \xi\right) = 0 \quad \mathbf{x}, \xi \in \mathbb{R}^n$$

$$R_k = \begin{pmatrix} 1 & 0 \\ 0 & e^{2\pi i 2^{-k}} \end{pmatrix} \rightarrow \begin{pmatrix} 1 & 0 \\ 0 & e^{2\pi i (2^{-k} + \phi)} \end{pmatrix} = \begin{pmatrix} 1 & 0 \\ 0 & e^{2\pi i 2^{-k}} \end{pmatrix} \begin{pmatrix} 1 & 0 \\ 0 & e^{2\pi i \phi} \end{pmatrix} = R_k R_\phi = R_\phi R_k$$