

$$T^{[1]} = \left[\begin{array}{ccc} pI & (1-p)\sigma_1^X & I \end{array} \right]$$

$$T^{[i]} = \left[\begin{array}{ccc} I & 0 & 0 \\ \sigma_i^X & 0 & 0 \\ 0 & (1-p)\sigma_i^X & I \end{array} \right]$$

$$T^{[N]} = \left[\begin{array}{c} I \\ \sigma_N^X \\ 0 \end{array} \right]$$