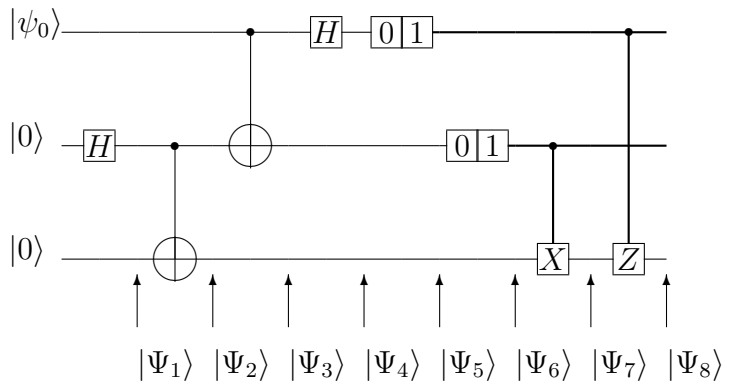
0.1 量子回路図



0.2 状態遷移

0.2.1 状態の定義

$$|\psi_0\rangle = c_0 |0\rangle + c_1 |1\rangle \tag{1}$$

0.2.2 状態遷移

初期状態

$$\frac{1}{\sqrt{c_0^2 + c_1^2}} (c_0 |000\rangle + c_1 |100\rangle) \tag{2}$$

$$|\Psi_1\rangle = \frac{1}{\sqrt{2c_0^2 + 2c_1^2}} (c_0 |000\rangle + c_0 |010\rangle + c_1 |100\rangle + c_1 |110\rangle) \tag{3}$$

$$|\Psi_2\rangle = \frac{1}{\sqrt{2c_0^2 + 2c_1^2}} (c_0 |000\rangle + c_0 |011\rangle + c_1 |100\rangle + c_1 |111\rangle) \tag{4}$$

$$|\Psi_3\rangle = \frac{1}{\sqrt{2c_0^2 + 2c_1^2}} (c_0 |000\rangle + c_0 |011\rangle + c_1 |101\rangle + c_1 |110\rangle) \tag{5}$$

$$|\Psi_4\rangle = \frac{1}{\sqrt{4c_0^2 + 4c_1^2}} (c_0 |000\rangle + c_1 |001\rangle + c_1 |010\rangle + c_0 |011\rangle + c_0 |100\rangle - c_1 |101\rangle - c_1 |110\rangle + c_0 |111\rangle) \tag{6}$$

$$|\Psi_5\rangle = \begin{cases} Case_0 & \frac{1}{\sqrt{2c_0^2+2c_1^2}} (c_0 |00\rangle + c_1 |01\rangle + c_1 |10\rangle + c_0 |11\rangle) \\ Case_1 & \frac{1}{\sqrt{2c_0^2+2c_1^2}} (c_0 |00\rangle - c_1 |01\rangle - c_1 |10\rangle + c_0 |11\rangle) \end{cases} \tag{7}$$

$$|\Psi_6\rangle = \begin{cases} Case_{00} & \frac{1}{\sqrt{c_0^2+c_1^2}}\left(c_0|0\rangle + c_1|1\rangle\right) \\ Case_{01} & \frac{1}{\sqrt{c_0^2+c_1^2}}\left(c_0|0\rangle - c_1|1\rangle\right) \\ Case_{10} & \frac{1}{\sqrt{c_1^2+c_0^2}}\left(c_1|0\rangle + c_0|1\rangle\right) \\ Case_{11} & \frac{1}{\sqrt{c_1^2+c_0^2}}\left(-c_1|0\rangle + c_0|1\rangle\right) \end{cases} \tag{8}$$

$$|\Psi_7\rangle = \begin{cases} Case_{00} & \frac{1}{\sqrt{c_0^2+c_1^2}}\left(c_0|0\rangle + c_1|1\rangle\right) \\ Case_{01} & \frac{1}{\sqrt{c_0^2+c_1^2}}\left(c_0|0\rangle - c_1|1\rangle\right) \\ Case_{10} & \frac{1}{\sqrt{c_0^2+c_1^2}}\left(c_0|0\rangle + c_1|1\rangle\right) \\ Case_{11} & \frac{1}{\sqrt{c_0^2+c_1^2}}\left(c_0|0\rangle - c_1|1\rangle\right) \end{cases} \tag{9}$$

$$|\Psi_8\rangle = \begin{cases} Case_{00} & \frac{1}{\sqrt{c_0^2+c_1^2}}\left(c_0|0\rangle + c_1|1\rangle\right) \\ Case_{01} & \frac{1}{\sqrt{c_0^2+c_1^2}}\left(c_0|0\rangle + c_1|1\rangle\right) \\ Case_{10} & \frac{1}{\sqrt{c_0^2+c_1^2}}\left(c_0|0\rangle + c_1|1\rangle\right) \\ Case_{11} & \frac{1}{\sqrt{c_0^2+c_1^2}}\left(c_0|0\rangle + c_1|1\rangle\right) \end{cases} \tag{10}$$