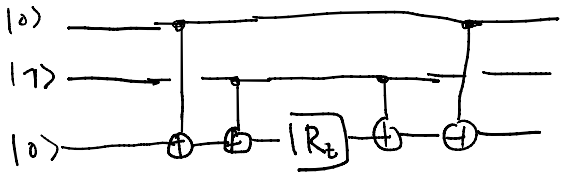
$e^{-\frac{i}{2}\theta Z_1 Z_2}$



$$e^{-\frac{i}{2}\theta Z_1 Z_2}|00\rangle = e^{-\frac{i}{2}\theta \cdot 1 \cdot 1}|00\rangle = e^{-\frac{i}{2}\theta}|00\rangle$$

$$e^{-\frac{i}{2}\theta Z_1 Z_2}|01\rangle = e^{\frac{i}{2}\theta}|01\rangle$$

$$M = \sum_k \lambda_k |k\rangle\langle k|$$

$$f(M) = \sum_k f(\lambda_k)|k\rangle\langle k|$$

initial state $|00\rangle$:

$$|00\rangle R_z(\theta)|0\rangle = |00\rangle e^{-\frac{i}{2}\theta}|0\rangle \qquad R_z(\theta) = e^{-\frac{i}{2}\theta Z}$$

$$= e^{-\frac{i}{2}\theta}|00\rangle|0\rangle$$

initial state $|01\rangle$:

$$|01\rangle R_z(\theta)|1\rangle = |01\rangle e^{\frac{i}{2}\theta}|1\rangle = e^{\frac{i}{2}\theta}|01\rangle|1\rangle$$

$$\mapsto e^{\frac{i}{2}\theta}|01\rangle|0\rangle$$