

Figure 1

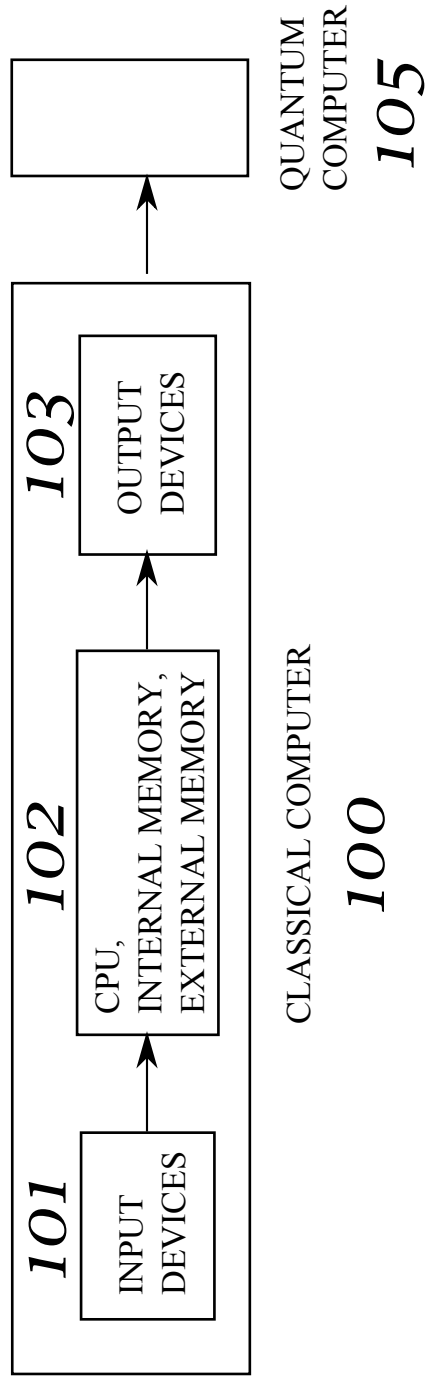


Figure 2

$$|z_0|^2 + |z_1|^2 + \langle \chi | \chi \rangle = 1 \quad \mathbf{201}$$

$$p = |z_0|^2 + |z_1|^2, \quad q = 1 - p \quad \mathbf{202}$$

$$|s\rangle_{\mu,\nu,\omega} = \begin{array}{c} z_0 |\psi_0\rangle_\mu \\ |0\rangle_\nu \\ |0\rangle_\omega \end{array} + \begin{array}{c} z_1 |\psi_1\rangle_\mu \\ |1\rangle_\nu \\ |0\rangle_\omega \end{array} + \begin{array}{c} |\chi\rangle_{\mu,\nu} \\ |1\rangle_\omega \end{array} \quad \mathbf{203}$$

$$|t\rangle_{\mu,\nu,\omega} = \frac{1}{\sqrt{p}} \left[\begin{array}{c} z_0 |\psi_0\rangle_\mu \\ |0\rangle_\nu \\ |0\rangle_\omega \end{array} + \begin{array}{c} z_1 |\psi_1\rangle_\mu \\ |1\rangle_\nu \\ |0\rangle_\omega \end{array} \right] \quad \mathbf{204}$$

$$\begin{aligned} [|t\rangle \langle t|]_{\mu,\nu,\omega} |s\rangle_{\mu,\nu,\omega} &= \sqrt{p} |t\rangle_{\mu,\nu,\omega} \\ [|0\rangle \langle 0|]_\omega |s\rangle_{\mu,\nu,\omega} &= \sqrt{p} |t\rangle_{\mu,\nu,\omega} \end{aligned} \quad \mathbf{205}$$

$$\begin{aligned} [|t\rangle \langle t|]_{\mu,\nu,\omega} |t\rangle_{\mu,\nu,\omega} &= |t\rangle_{\mu,\nu,\omega} \\ [|0\rangle \langle 0|]_\omega |t\rangle_{\mu,\nu,\omega} &= |t\rangle_{\mu,\nu,\omega} \end{aligned} \quad \mathbf{206}$$

$$\langle t | s \rangle = \sqrt{p} \quad \mathbf{207}$$

$$\text{tr}_{\mu,\omega} \left\{ |t\rangle \langle t|_{\mu,\nu,\omega} \right\} = P(0) |0\rangle \langle 0|_\nu + P(1) |1\rangle \langle 1|_\nu \quad \mathbf{208}$$

$$P(0) = |z_0|^2/p, \quad P(1) = |z_1|^2/p \quad \mathbf{209}$$

$$|z_1|^2 = \frac{P(1)}{P(0)} |z_0|^2 \quad \mathbf{210}$$

Figure 3

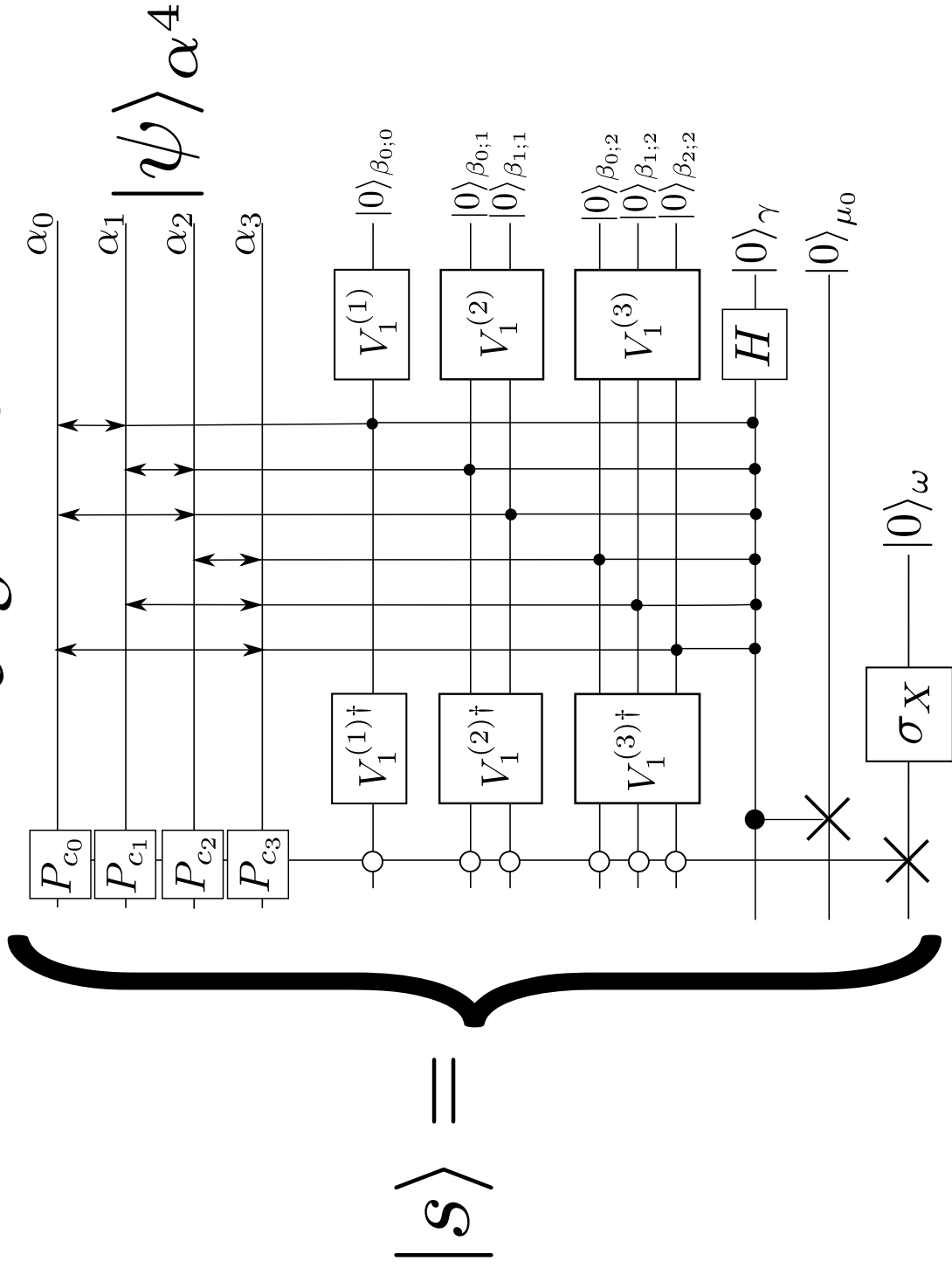


Figure 4

$$|\{1, 0^{\lambda-1}\}\rangle = \left\{ \begin{array}{l} |10^{\lambda-1}\rangle + |010^{\lambda-2}\rangle \\ + |0^2 10^{\lambda-3}\rangle + \dots + |0^{\lambda-1} 1\rangle \end{array} \right. \quad \mathbf{401}$$

$$V_1^{(\lambda)} : |0^\lambda\rangle \mapsto \frac{1}{\sqrt{\lambda+1}} [|0^\lambda\rangle + |\{1, 0^{\lambda-1}\}\rangle] \quad \mathbf{402}$$

$$|s\rangle_{\mu,\nu,\omega} = \begin{array}{c} z_1 |\psi_1\rangle_\mu \\ |1\rangle_\nu \\ |0\rangle_\omega \end{array} + \begin{array}{c} z_0 |\psi_0\rangle_\mu \\ |0\rangle_\nu \\ |0\rangle_\omega \end{array} + \begin{array}{c} |\chi\rangle_{\mu,\nu} \\ |1\rangle_\omega \end{array} \quad \mathbf{403}$$

$$|\psi_1\rangle_\mu = \begin{array}{c} |c^4\rangle_\alpha \\ |1\rangle_{\mu_0} \end{array} \quad \left| \quad \begin{array}{c} |\psi_0\rangle_\mu = |c^4\rangle_\alpha \\ |0\rangle_{\mu_0} \end{array} \right. \quad \mathbf{404}$$


$$|1\rangle_\nu = \left[\begin{array}{c} |0\rangle_{\beta;0} \\ |00\rangle_{\beta;1} \\ |000\rangle_{\beta;2} \\ |1\rangle_\gamma \end{array} \right] \quad \left| \quad \begin{array}{c} |0\rangle_\nu = \left[\begin{array}{c} |0\rangle_{\beta;0} \\ |00\rangle_{\beta;1} \\ |000\rangle_{\beta;2} \\ |0\rangle_\gamma \end{array} \right] \end{array} \right. \quad \mathbf{405}$$

$$z_1 = \frac{1}{\sqrt{2}} \langle c^4 | \pi_{Sym_4} | \psi \rangle = \sqrt{\frac{Q^{(4)}(c^4)}{2}} \quad \mathbf{406}$$

$$z_0 = \frac{1}{\sqrt{2}} \langle c^4 | \psi \rangle \quad \mathbf{407}$$

$$\frac{|z_1|}{|z_0|} = \sqrt{\frac{P(1)}{P(0)}} \quad \mathbf{408}$$

Figure 5

qSym 

Ver. 1.6

Inputs

File Prefix

Number of Qudits

Sub-qubits Per Qudit

c matrix

	sub 0	sub 1	sub 2
dit 0	<input checked="" type="radio"/>	<input type="radio"/>	
dit 1	<input type="radio"/>	<input checked="" type="radio"/>	
dit 2	<input checked="" type="radio"/>	<input checked="" type="radio"/>	
dit 3			

Estimate of $|z_1|^2 / |z_0|^2$

Maximum Number of Grover Steps

Gamma Tolerance (degs)

Delta Lambda (degs)

Outputs

$|z_0|^2$

Starting Gamma (degs)

Final Gamma (degs)

Number of Grover Steps

Number of Qubits

Number of Elem. Ops.