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Corrigendum

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We have made an incorrect assertion below equation (7) regarding the eigenvalues of the Hamiltonian H in (7). The correct eigenvalues for the Hamiltonian H in (7) are $\pm\xi/2$. The subsequent formulae appearing in the paper thus need to be amended as follows. Since the difference of the largest and the smallest eigenvalues of the Hamiltonian is 2ω, we have $\xi = 2\omega$. The Hamiltonian in (8) then reads

$$H = \frac{\mathrm{i}\omega}{\sin\frac{1}{2}\theta}|\psi_I\rangle\langle\psi_F| - \frac{\mathrm{i}\omega}{\sin\frac{1}{2}\theta}|\psi_F\rangle\langle\psi_I| + h(t)\mathbf{1}. \tag{8}$$

The energy variance obtained in (9) must be replaced with

$$\Delta H = \omega, \tag{9}$$

and the time required for the optimal transformation obtained in (10) must be replaced with

$$\tau = \frac{\hbar\theta}{2\omega}. \tag{10}$$

The expression for the time dependent state vector in (11) becomes

$$|\psi(t)\rangle = \left[\cos\left(\frac{\omega t}{\hbar}\right) - \frac{\cos\frac{1}{2}\theta}{\sin\frac{1}{2}\theta}\sin\left(\frac{\omega t}{\hbar}\right)\right]|\psi_I\rangle + \frac{1}{\sin\frac{1}{2}\theta}\sin\left(\frac{\omega t}{\hbar}\right)|\psi_F\rangle. \tag{11}$$

The coefficient of $|\psi_I\rangle$ in $|\psi(t)\rangle$ first vanishes at time $t = \hbar\theta/2\omega$.

