

## On optimum Hamiltonians for state transformation

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## Corrigendum

### On optimum Hamiltonians for state transformation

Dorje C Brody and Daniel W Hook 2006 *J. Phys. A: Math. Gen.* **39** L167–170

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  $2\omega$ , we have  $\xi = 2\omega$ . The Hamiltonian in (8) then reads

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

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

$$\Delta H = \omega, \quad (9)$$

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

$$\tau = \frac{\hbar\theta}{2\omega}. \quad (10)$$

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

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

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