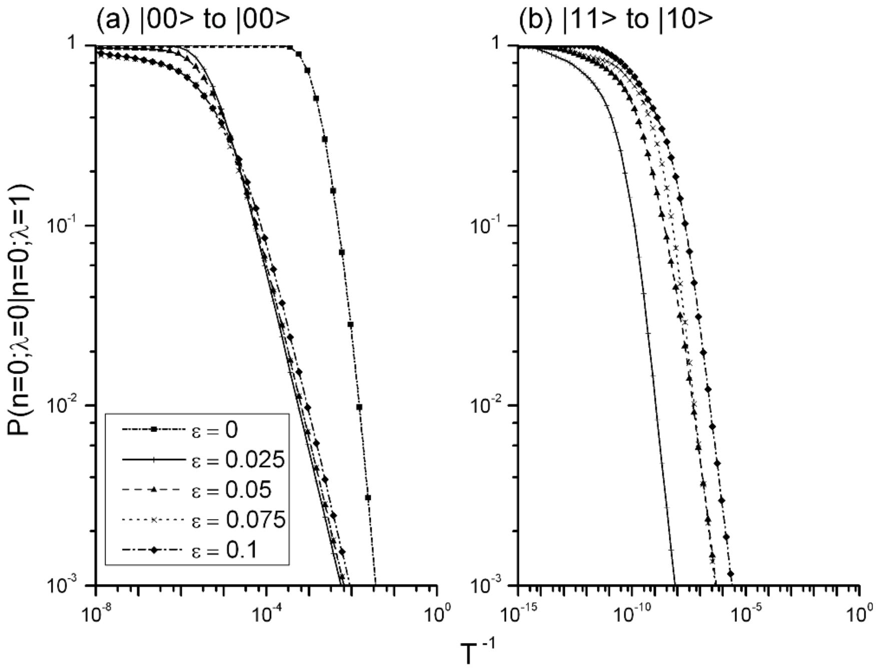

FIG. 2. Plot of the success probability, averaged over a number of noise realisations, against computation speed for the $|00\rangle \rightarrow |00\rangle$ and $|11\rangle \rightarrow |10\rangle$ operations of the CNOT gate at various noise amplitudes. Fits to the polynomial regions, i.e. where $P \propto T^{-\gamma}$, of the curves yield exponents of; $\gamma = 4/3$ for the $\epsilon = 0$ case of the $|00\rangle \rightarrow |00\rangle$ operation, and $\gamma \approx 1$ for all other cases.

$\mathcal{H}(\lambda(t))$ will be broken naturally.

VI. EFFECTS OF AN ARTIFICIAL NOISE SOURCE

So far we have viewed $\delta h(\lambda)$ as the natural effect of a number of noise sources that are coupled to the system. If we now envisage a physical system with a negligible level of intrinsic noise. In this situation, it may be beneficial to add an artificial random perturbation to the system. This would be in order to break any degeneracies in the spectrum and offer an alternate, and possibly more efficient, path between the initial and final Hamiltonians. A perturbation term with a time-dependent amplitude, which is large enough to widen the energy gaps at avoided crossings throughout the majority of the computation process but then tends to 0 as $\lambda(t) \rightarrow 0$, would be preferable. For example we could take

$$\epsilon(\lambda) = \epsilon_0 \tanh(\alpha\lambda) \tag{7}$$