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A Lindblad-like dynamical equation for general open-system dynamics: Role of correlations

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Abstract

Derivation of dynamical equation for open quantum systems is essential in studying dynamical behaviors of various physical properties in the system. Here we derive a Lindblad-like dynamical equation for a general quantum system with no approximation. We explicitly show the dependence of the rates and jump operators on the correlation between the system and its environment. As a special case, we derive a Markovian equation with this natural assumption that the buildup correlation between the system and environment is periodically reset to zero. This equation in general differs from the standard Markovian equation in the Lindblad form. In an example, we compare the standard Lindblad equation and our Lindblad-like equation.