Completely positive reduced dynamics with non-Markovian initial states

S Nazifkar* and I Sargolzahi

Department of Physics, University of Neyshabur, Neyshabur, Iran

E-mail: nazifkar@neyshabur.ac.ir

Abstract

Consider an open quantum system S, interacting with its environment E, and also an ancillary Hilbert space R. The reduced dynamics of the system S is given by a completely positive map, if the set $\boldsymbol{S} = \{\rho_{SE}\}$, of possible initial states of the system-environment, can be written as a *steered* set from a tripartite *Markov* state τ_{RSE}. In this paper, we call such steered states ρ_{SE} as *Markovian* states, and study a physical case, in which the reduced dynamics of the system can be completely positive, even when the initial states of the system-environment ρ_{SE} are non-Markovian.

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