Admissible memory kernels for random unitary qubit evolution

Filip A. Wudarski, Paweł Należyty, Gniewomir Sarbicki and Dariusz Chruściński

Institute of Physics,

Nicolaus Copernicus University, Torun, Poland

Abstract

We analyze random unitary evolution of a qubit within memory kernel approach. We provide sufficient conditions which guarantee that the corresponding memory kernel generates physically legitimate quantum evolution. Interestingly, we are able to recover several well-known examples and to generate new classes of nontrivial qubit evolution. Surprisingly, it turns out that a class of quantum evolutions with memory kernel generated by our approach gives rise to the vanishing of a non-Markovianity measure based on the distinguishability of quantum states.