Entanglement-Optimal Unravellings of Quantum Many-Body Markov Processes

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We discuss an approach to solve the equations of motion of open quantum many-body systems based on a combination of generalized wave function trajectories and matrix product states. Specifically, we introduce an adaptive quantum stochastic propagator, which minimizes the expected entanglement in the trajectories, thus minimizing the computational cost of a matrix product state representation. We illustrate this approach on the example of one-dimensional open Brownian circuit and show that this model (1) hosts a measurement induced entanglement phase transition between area and volume law when changing between different stochastic propagators, and (2) that our method autonomously finds an efficiently representable area law unravelling.