Steady state formulation of inchworm Quantum Monte Carlo

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We present an inchworm Quantum Monte Carlo method that is directly formulated in the steady-state. Until now, numerically exact real time Monte Carlo methods simulated steady-state dynamics by propagating from a tractable initial condition to long times. The computational cost for accessing nonequilibrium steady-states in these methods is often prohibitive. We overcome this issue by reformulating the inchworm equations such that they can directly be solved for the steady-state. We demonstrate the performance of our steady-state inchworm Quantum Monte Carlo method by comparison with analytical results and other numerically exact techniques and showcase its usage within dynamical mean field simulations. The steady-state inchworm Quantum Monte Carlo method closes the gap between short-time dynamics and the long-time behavior and extends the regime of applicability for nonequilibrium Monte Carlo methods as impurity solvers within quantum embedding schemes.