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*Information theoretic tools for the numerical analysis of stochastic systems*

We analyze operator splitting schemes for Markov processes, with the parallelization of kinetic Monte-Carlo as a guiding example. We study these schemes in particular in the long-time (steady-state) regime by using information theoretic tools to compare the original process with the approximate process generated by the numerical scheme. Combined with new information inequalities this allows to control weak errors in the long-time regime. In addition our approach provide a-posteriori estimates that can be tracked in straightforward manner in numerical simulations.