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Parallel time integration: application to stochastic dynamics

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Abstract

Numerical simulation of a high dimensional stochastic non-linear dynamical system is computational intensive. One way to reduce the computational efforts is to spatially decompose the problem into small problems and solve them in parallel using domain decomposition methods. However, most of the available algorithms have a certain limit on scalability. In order to make the most effective use of the available computational resources, parallelization are being explored in temporal domain. Certain parallel time integrators such as “parareal” and parallel implicit time integration algorithm (PITA) have been reported in the literature. In the current investigation, we are exploring their possible extensions and feasibility to tackle a stochastic non-linear dynamical system problem.