

New Time Reversible and Volume Preserving Multiple Scale Integrators

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For Hamiltonian systems, it is well established that symplectic methods have desirable long term stability properties, and methods within this class are now in widespread use for applications in molecular dynamics and astronomical simulation. Symplecticness can be a restrictive requirement in designing integrators for systems with components that evolve on a wide range of spatial and time scales. While less well established from a theoretical perspective, time-reversible/volume preserving methods appear to offer a practical, more flexible alternative to symplectic methods in some cases. In this talk I will describe a new approach to designing time-reversible volume preserving multiscale integrators.

This talk describes joint work with Zhidong Jia.