

Chaos and Ergodicity of Realistic Hamiltonian Systems
Le chaos et l'ergodicité pour des systèmes Hamiltoniens réalistes
11–14 December 2007

*Stochastic variational integrators. Theory,
applications and perspectives*

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Abstract

This talk presents stochastic variational integrators (SVIs) which are based on a Lagrangian description of stochastic Hamiltonian systems on manifolds. With dissipation these systems become the important class of mechanical systems governed by Langevin-type equations. SVIs provide an effective tool to simulate equilibrium, and for the first time, nonequilibrium dynamics of randomly forced and torqued mechanical systems on manifolds. The talk shows how one can use SVI theory to extend Verlet integrators to: mechanical systems with holonomic constraints at uniform temperature and rigid-body-type systems at uniform temperature. These are easy consequences of the fact that SVIs are derived from intrinsically defined objects. As an application of SVIs, the talk considers a ballistic pendulum — a perturbation of the simple gravity pendulum that exhibits ballistic transport in its pendular degree of freedom.