

Constrained and stochastic variational principles for dissipative equations

Tudor S. Ratiu

School of Mathematics

Shanghai Jiao Tong University, 200240 Shanghai, China

Joint work with Xin Chen Ana Bela Cruzeiro

Symmetry reduction for material stochastic Lagrangian systems with advected quantities whose configuration space is a Lie group is presented. Such variational principles yield deterministic constrained variational principles and dissipative equations of motion in spatial representation. The general theory is developed for the finite dimensional situation. In infinite dimensions, where the Lie group is often a diffeomorphism group, the general result is not directly applicable but the method of proof leads to similar results, needed to be proved independently. We apply this technique to magnetohydrodynamics for charged viscous compressible fluids.