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Automatically generated variational integrators

Many fundamental physical systems have variational formulations, such as mechanical systems in their Lagrangian formulation. Discretization of the variational principles leads to (implicit) symplectic and momentum preserving one step integration methods. However, such methods can be very complicated.

I will describe some advances in the basic theory of variational integrators, and a software system called AUDELSI, which converts any ordinary one step method into a variational integrator of the same order.