GEORGE PATRICK, University of Saskatchewan
Local error analysis of variational integrators

Due to a singularity or degeneracy at zero time-step, existence and uniqueness, and accuracy, of variational integrators, cannot be established by straightforward use of the implicit function theorem. We show existence and uniqueness for variational integrators by blowing up the associated discrete variational principle. The blow-up leads to an accuracy one less than is observed in simulations, a deficit that is recovered by a past-future symmetry at zero time-step.