

REDUCTION BY STAGES OF DISCRETE MECHANICAL SYSTEMS: A DISCRETE
LAGRANGE-POINCARÉ APPROACH

Javier Fernandez

Instituto Balseiro, Argentina

jfernand@ib.edu.ar

Discrete mechanical systems (DMS) are a type of dynamical system whose trajectories are the extrema of a discrete variational problem determined by a discrete Lagrangian function. Those trajectories provide interesting numerical integrators. Under fairly reasonable conditions symmetric DMSs can be reduced, that is, a new dynamical system can be constructed whose dynamics captures the essential features of the original one. In some cases, it is convenient to perform the reduction procedure in more than one step, what is generically known as reduction by stages. Unfortunately, the reduced systems are usually not DMSs so that a second reduction may not be possible within the standard DMS theory.

In this talk we expand the family of DMSs to a new family, the discrete Lagrange-Poincaré systems, that is closed under reduction. As a consequence, the reduction by stages can be satisfactorily performed.