

Title: Discrete nonholonomic mechanics: Global and local descriptions

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*Abstract:*

In this talk we discuss the construction of geometric integrators for nonholonomic mechanical systems.

We first derive the nonholonomic discrete Euler-Lagrange equations in a setting which permits to deduce geometric integrators for continuous nonholonomic systems (reduced or not). The formalism is given in terms of Lie groupoids, specifying a discrete lagrangian and a constraint submanifold on it. Additionally, it is necessary to fix a vector subbundle of the Lie algebroid associated to the Lie groupoid.

Finally, we also give a local description of the nonholonomic discrete equations on Lie groupoids using symmetric neighborhoods and bisections.

References:

Marrero, Juan C.; Martín de Diego, David; Martínez, Eduardo Discrete Lagrangian and Hamiltonian mechanics on Lie groupoids. *Nonlinearity* 19 (2006), no. 6, 1313-1348.

Iglesias, David; Marrero, Juan C.; Martín de Diego, David; Martínez, Eduardo: Discrete nonholonomic Lagrangian systems on Lie groupoids. *J. Nonlinear Sci.* 18 (2008), no. 3, 221-276.