

*High-order integrators on homogeneous spaces via
nonholonomic mechanics*

Rodrigo T. Sato Martín de Almagro @ (FAU - Lehrstuhl für
Technische Dynamik)
R 1.23 Thu Z3 14:30-15:00

In this talk, high-order numerical integrators on homogeneous spaces will be presented as an application of nonholonomic partitioned RKMK methods on Lie groups.

A homogeneous space M is a manifold where a group G acts transitively. Such a space can be understood as a quotient $M \cong G/H$, where H a closed Lie subgroup, is the isotropy group of each point of M . The Lie algebra of G decomposes into $\mathfrak{g} = \mathfrak{m} \oplus \mathfrak{h}$, where \mathfrak{h} is the subalgebra associated with H . Thus, variational problems on M can be treated as nonholonomically constrained problems on G , by requiring variations to remain on \mathfrak{m} .

Nonholonomic partitioned RKMK integrators are derived as a modification of those obtained by a discrete variational principle on Lie groups, and can be interpreted as obeying a discrete Chetaev principle. These integrators seem to preserve several properties of their purely variational counterparts.