

Vakonomic mechanics on Lie affgebroids

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The geometry and dynamics on Lie algebroids have been extensively studied during the past years. From the Physics point of view, Lie algebroids can be used to give geometric descriptions of Lagrangian and Hamiltonian Mechanics (see [5, 6]). In the same direction, the cases of nonholonomic and vakonomic mechanics on Lie algebroids has been analyzed (see [1, 2]).

A possible generalization of the concept of a Lie algebroid to affine bundles is the notion of a Lie affgebroid. Lie affgebroid structures may be used to develop a time-dependent version of Lagrange and Hamilton equations on Lie algebroids (see [4, 7]). In the same setting of Lie affgebroids, we have developed a geometric description of Lagrangian systems subject to nonholonomic affine constraints (see [3]).

In this talk, we will present a geometric description of vakonomic mechanics on Lie affgebroids. Moreover, we will introduce the notion of a regular vakonomic system on a Lie affgebroid. In this situation, we will define the vakonomic aff-Poisson bracket whose affine-linear part gives the evolution of an observable.

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