

The nonholonomic Maupertuis-Jacobi principle: from contact geometry to applications

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Abstract

The Maupertuis-Jacobi principle is a famous theorem from classical mechanics stating that trajectories of systems with mechanical Lagrangians and fixed value of energy are reparametrizations of geodesics with unit velocity associated with a metric called the Jacobi metric.

The generalization of this result for nonholonomic mechanical systems has been assumed for a while. For example, in [1], the author proved the result in a local chart. However, a global geometric framework to prove it was unknown to us until the date.

In this talk, we will start by presenting such geometric framework, which will take us to contact geometry, and then we will see a problem where the nonholonomic Maupertuis-Jacobi principle becomes useful to prove a result about nonholonomic mechanical trajectories.

References

- [1] Koiller, J.: Reduction of some classical nonholonomic systems with symmetry. *Arch. Rational Mech. Anal.*, 118, 2, 113–148, 1992.

¹A. Simoes acknowledges FCT for the PhD research fellowship SFRH/BD/129882/2017.