Mathematics > Differential Geometry

Geometry of optimal control for control-affine systems

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Motivated by the ubiquity of control-affine systems in optimal control theory, we investigate the geometry of point-affine control systems with metric structures in dimensions two and three. We compute local isometric invariants for point-affine distributions of constant type with metric structures for systems with 2 states and 1 control and systems with 3 states and 1 control, and use Pontryagin's Maximum Principle to find geodesic trajectories for homogeneous examples. Even in these low dimensions, the behavior of these systems is surprisingly rich and varied.

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