

Topological vs. limiting arguments in the proofs of versions of the Pontryagin maximum principle

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Abstract

We compare two different methods for proving versions of the finite-dimensional first-order necessary conditions for optimal control, and argue that the results obtained with these two techniques are genuinely different and cannot be combined into a single theorem. In particular, we show that the maximum principle for systems of Lipschitz vector fields, which is true when the endpoint constraints are formulated using Boltyanskii tangent cones or Mordukhovich normal cones, turns out to be false in general when one of the constraints involves a Boltyanskii tangent cone and the other one uses a Clarke cone.