

Second Order Necessary Conditions for Control-Affine Problems with State Constraints

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Abstract

We establish new second order necessary conditions for control-affine problems (i.e. with a Hamiltonian that is an affine function of the control) with a scalar control and a scalar state constraint. These optimality conditions extend to the constrained state framework the Goh transform, which is the classical tool for obtaining an extension of the Legendre condition. Then we show how to design a shooting algorithm in order to solve such problems, extending [2]. The presentation is based on the joint work [1] with S. Aronna and B.S. Goh.

References

- [1] ARONNA S., BONNANS J.F., GOH B.S., Second order necessary conditions for control-affine problems with state constraints. Research report, to appear.
- [2] ARONNA S., BONNANS J.F., MARTINON P., A well-posed shooting algorithm for optimal control problems with singular arcs. *J. Optim. Theory Applications* **158** (2): 419-459, 2013.