Poggiolini, L.

On local state optimality of bang-bang extremal. (English) Zbl 1169.49019

Rend. Semin. Mat., Univ. Politec. Torino 64, No. 1, 1-23 (2006).

Summary: Free horizon optimal control problems are studied where the cost functional is given by

$$C(T,\xi,u) = c_0(\xi(0)) + c_f(\xi(T)) + \int_0^T f^0(\xi(t),u(t))\,dt.$$

Sufficient second-order conditions are given for the trajectory $\widehat{\xi}$ of a bang-bang regular Pontryagin extremal $(\widehat{T},\widehat{\xi},\widehat{u})$ to be state locally optimal.

The control system is control-affine and the controls take values in a polyhedron. The state space and the end points constraints are smooth finite-dimensional manifolds. The hypotheses made concern the positivity of the second variation of the finite-dimensional sub-problem obtained by perturbation of the switching times only and the injectivity of the reference trajectory $\widehat{\xi}$.

MSC:

49K15 Optimality conditions for problems involving ordinary differential equations

49K30 Optimality conditions for solutions belonging to restricted classes (Lipschitz controls, bang-bang controls, etc.)

Keywords:

free horizon optimal control problems; sufficient second-order conditions; bang-bang regular Pontryagin extremal

Full Text: EuDML