

Sufficient conditions for approximability with the same endpoints of trajectories of a system by trajectories arising from a dense set of controls

Héctor J. Sussmann

Rutgers University, NJ

We consider a control system with a class of controls U , and a subclass V of U . (For example, U could be the class of relaxed controls, and V the class of ordinary controls, or U could be the class of ordinary controls, and V the class of bang-bang controls.) We study the question of approximating a trajectory x corresponding to a control in U by trajectories corresponding to controls in V that have the same endpoint as x . We prove that such approximation is possible for a trajectory x provided that (a) x satisfies the sufficient condition for local controllability given by the Pontryagin Maximum Principle, and (b) V is n -dense in U (where n is the dimension of the state space), in the sense that every continuous map from B^n to U (where B^n is the n -dimensional unit ball) can be approximated by continuous maps from B^n to V .