

Bonnard, B.; Kupka, I.

Generic properties of singular trajectories. (English) Zbl 0907.93020
Ann. Inst. Henri Poincaré, Anal. Non Linéaire 14, No. 2, 167-186 (1997).

The authors consider the singular extremals of a control system on a σ -compact C^∞ manifold M . The system is of type

$$\dot{x}(t) = F_0(x(t)) + u(t)F_1(x(t)), \quad t \in J \equiv [T_1, T_2].$$

Let H_0, H_1 be the Hamiltonians canonically defined by F_0, F_1 on T^*M , and let \vec{H}_0, \vec{H}_1 be the associated vector fields. The singular extremals are the solutions of the system on T^*M

$$\dot{z}(t) = \vec{H}_0(z(t)) + u(t)\vec{H}_1(z(t))$$

satisfying the Pontryagin Maximum Principle. A singular extremal is said to be of minimum order if the set

$$\{t \in J : \{\{H_0, H_1\}, H_1\}(z(t)) \neq 0\}$$

is dense in J . The main result proved states that there is an open dense subset G in the space of couples of C^∞ vector fields with the C^∞ Whitney topology such that the control system associated to any couple $(F_0, F_1) \in G$ has only minimal order singular trajectories, moreover each extremal trajectory is determined, up to a constant, by its projection on M .

Reviewer: [Gianna Stefani \(Firenze\)](#)

MSC:

93B29 Differential-geometric methods in systems theory (MSC2000)
49N60 Regularity of solutions in optimal control

Cited in **13** Documents

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