

Sufficient optimality conditions for extremal controls in optimal control problems

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In given report we consider an optimal control problem for a functional with a convex terminal function. Sufficient optimality conditions are obtained on the basis of nonstandard formulas of the functional increment, which are commonly used to construct numerical methods for successive improvement of admissible controls. The definitions of strongly extremal controls for each formula are introduced. These controls maximize the Pontryagin function for the set of phase or conjugate trajectories. In linear and quadratic problems strongly extremal controls are optimal. In the general case, the optimality property is provided by the concavity of the Pontryagin function with respect to phase variables. Examples of effective realization of obtained conditions in comparison with known results are given.