

# SYSTEMS WITH IMPULSE CONTROL: THE PROBLEM OF CONTROL SYNTHESIS

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Solving the problem of control synthesis is one of the main topics in control theory. Thus, in the classical theory with hard bounds on the controls, the solutions may turn to be of the “bang-bang” type with synthesized control strategy described through “switching surfaces” which divide the state space into regions with continuous controls and allow discontinuities (“switchings”) on these surfaces.

However, in many applied problems, for example, those related to control in aerospace through instantaneous corrections, control under communication constraints or logically controlled systems the solutions may turn to be of the impulse type which requires the control to be of generalized nature, consisting of impulse “delta-functions” or their combination with bang-bang controls or continuous controls. Such problems were mostly treated as those of open-loop control.

The present paper indicates the possibility of a dynamic programming approach to problems of impulse control which yields solutions in the form of synthesizing control strategies. The discussion is restricted to linear systems which allows to incorporate the classical theory of distributions together with theory of generalized (viscosity) solutions for related inequalities of the Hamilton-Jacobi-Bellman type.