
A REGULARITY CONDITION IN CONTINUOUS-TIME OPTIMIZATION PROBLEMS WITH INEQUALITY PHASE CONSTRAINTS

Aleksandar Jović^{1,*}

¹Faculty of Mathematics, University of Belgrade, Studentski trg 16, 11000 Belgrade, Serbia

ABSTRACT

Continuous-time optimization problems were introduced by Bellman [1] in 1953. Due to their importance in modelling various decision-making processes in the fields of robotics, mechanical engineering, aircraft control system design, and machine learning, continuous-time optimization problems have attracted considerable attention in the last 30 years, resulting in an extensive literature devoted to their various theoretical and computational aspects. The theory of scalar and vector continuous-time optimization has been intensively studied, and a large number of optimality conditions and dual models have been established. It should be noted that the validity of some results in this area has been questioned in recent research.

In this paper, we consider the nonsmooth and smooth case of a continuous-time optimization problem with inequality phase constraints defined in $L_\infty([0, T]; \mathbb{R}^n)$. We establish new optimality conditions under an additional regularity condition and give some guidelines for obtaining optimality criteria of the Lyapunov-type extremal problem.

Keywords Continuous-time programming · Optimality conditions · Convexity · Optimal control

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*Corresponding Author's E-mail: ajovic@matf.bg.ac.rs