P-ORDER NECESSARY AND SUFFICIENT CONDITIONS FOR OPTIMALITY IN SINGULAR CALCULUS OF VARIATIONS

AGNIESZKA PRUSIŃSKA¹ AND ALEXEI TRET’YAKOV¹,²

¹Institute of Mathematics and Physics
University of Podlasie, Poland
e-mail: aprus@ap.siedlce.pl

²System Research Institute
Polish Academy of Sciences, Warsaw, Poland
and Dorodnicyn Computing Center, Moscow, Russia
e-mail: tret@ap.siedlce.pl

Abstract

This paper is devoted to singular calculus of variations problems with constraint functional not regular at the solution point in the sense that the first derivative is not surjective. In the first part of the paper we pursue an approach based on the constructions of the $p$-regularity theory. For $p$-regular calculus of variations problem we formulate and prove necessary and sufficient conditions for optimality in singular case and illustrate our results by classical example of calculus of variations problem.

Keywords: singular variational problem, necessary condition of optimality, $p$-regularity, $p$-factor operator.

2000 Mathematics Subject Classification: 49K27, 46N10, 49N60, 90C30.

References


Received 6 October 2009