

Nonoccurrence of the Lavrentiev phenomenon for many constrained variational problems without convexity assumptions

ALEXANDER J. ZASLAVSKI

Department of Mathematics
The Technion-Israel Institute of Technology
32000 Haifa, Israel
e-mail: ajzasltx.technion.ac.il

Abstract

In this talk we discuss the nonoccurrence of the Lavrentiev phenomenon for a large class of nonconvex nonautonomous constrained variational problems. The state variable belongs to a convex subset of a Banach space with nonempty interior. Integrands belong to a complete metric space M of functions which satisfy a growth condition common in the literature and are Lipschitz on bounded sets. In our work in *Ann. Inst. H. Poincaré Anal. Non Linéaire* 22 (2005) we consider a class of unconstrained variational problems with integrands belonging to a subset L of M and show that for any such integrand the infimum on the full admissible class is equal to the infimum on a subclass of Lipschitz functions with the same Lipschitz constant. In our more recent work in *Calculus of Variations and Partial Differential Equations* 28 (2007) we show that if an integrand f belongs to L , then this property also holds for any integrand which is contained in a certain neighborhood of f in M . Using this result we establish nonoccurrence of the Lavrentiev phenomenon for most elements of M in the sense of Baire category.