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General properties of (p,q)-convex functions and (p,q)-monotone operators. (English)

Zbl 0555.49007
Ric. Mat. 32, 285-319 (1983).

Summary: The paper deals with general properties of a class of functions, (p,q)-convex functions, and a class of nonlinear operators, (p,q)-monotone operators, defined in a Hilbert space H. These classes extend, respectively, that of $C^{1,1}$ perturbations of convex functions and that of Lipschitz continuous perturbations of monotone operators. The aim is to tackle problems with nonconvex constraints.

In particular, theorems are given, concerning the minimization of certain functions which are not lower semicontinuous with respect to the weak topology of H. The class of (p,q)-convex functions was introduced in the note by *E. De Giorgi, A. Marino* and *M. Tosques* [Atti Accad. Naz. Lincei, Rend., Cl. Sci. Fis. Mat. Natur. VIII. Ser. 73, 6–14 (1982; Zbl 0521.49011)], where some of the results contained in the paper were announced.

MSC:

49J27	Existence theories for problems in abstract spaces
46G05	Derivatives of functions in infinite-dimensional spaces
47H20	Semigroups of nonlinear operators
47H07	Monotone and positive operators on ordered Banach spaces or other ordered topological vector spaces
49J45	Methods involving semicontinuity and convergence; relaxation

Keywords:

non-convex minimization in Hilbert space; subdifferentials; points which are critical from below; evolution equations; (p,q)-convex functions; (p,q)-monotone operators; perturbations of convex functions; Lipschitz continuous perturbations of monotone operators; problems with non-convex constraints