Revalski, J. P.

Generic well-posedness in some classes of optimization problems. (English) Zbl 0644.49023

Acta Univ. Carol., Math. Phys. 28, No. 2, 117-125 (1987).

Let X be a complete metric space and P be the set of all couples (A,f), where A is a nonempty closed subset of X and $f : X \to R$ is a continuous and real-valued function bounded from below. Every pair (A,f)$\in P$ gives rise to a constrained optimization problem: find $x_0 \in A$ such that $f(x_0) = \inf\{f(x) : x \in A\}$. In this way P can be considered as a set of minimization problems. Let P be endowed with a natural complete metric generated by the Hausdorff metric on the sets A and a uniform metric on the functions f. A problem (A,f)$\in P$ is said to be well-posed in the sense of Hadamard if it has a unique solution which depends continuously on the data A and f. We do not require X (or A) to be compact, so a particular problem from P may have not even a solution. But since P is a complete metric space the next question makes sense: does the set $H = \{(A, f) \in P :$ (A,f) is Hadamard well-posed$\}$ contain a dense and G_δ-subset of P. In this case we say that most (in the Baire category sense) of the problems in P are Hadamard well-posed. In this paper a positive answer is given to this question. Also, a geometric characterization of Hadamard well-posedness, as well as relations between the Hadamard and other types of well-posedness are given. A class of convex constrained optimization problems is investigated through the above generic point of view.

Reviewer: J.P.Revalski

MSC:

49K40	Sensitivity, stability, well-posedness
54E52	Baire category, Baire spaces
90C48	Programming in abstract spaces

Keywords:
constrained optimization; Baire category; Hadamard well-posedness

Full Text: EuDML