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Well-posedness for optimization problems with constraints defined by variational inequalities having a unique solution. (English) Zbl 0960.90079

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In this paper, some notions of well-posedness are studied for parametric variational inequalities $VI(x)$ and for optimization problems with variational inequalities constraints $OPVIC$. The problem $VI(x)$ is defined by the pair $(A(x,u),K)$, where $A(x,.)$ is an operator from E to E^* and $K \subset E$ is a nonempty closed convex set. The $OPVIC$ is intended as minimizing the function $f(x,u)$ over the set $\{(x,u) \in X \times K \mid u \in T(x)\}$, where $T(x) \subset E$ is the solution set of $VI(x)$. In both cases the variational inequalities considered are supposed to be uniquely solvable.

The first notion studied is the parametrically strongly well-posedness of the family $VI(x)$, which is proven to be a generalization of the similar definition given by *T. Zolezzi* [Nonl. Anal., Theory Meth. Appl. 25, 437-453 (1995; Zbl 0841.49005)] for the case of parametric optimization problems. The authors give a characterization of the parametrically strongly well-posedness of $VI(x)$ for finite dimensional E and a sufficient condition for the case $A(u)$ does not depend on x. For the latter case it is also given another characterization of the introduced concept in terms of the diameter of an ϵ-solution set defined in a former paper. This last characterization can be extended only as a necessary condition to the general case $A(x,u)$.

In a second section the authors introduce the concept of approximating sequences for $OPVIC$, which generalizes the same notion used in a former paper by the second author for bilevel programming problems. The notions of generalized and strongly well-posedness of $OPVIC$ are defined and sufficient conditions are provided. Both concepts are also characterized in case of finite dimensional E. Finally, an application of the introduced concepts to an exact penalty method is shortly presented.

Reviewer: Walter Gomez Bofill (Cottbus)

MSC:

90C30 Nonlinear programming
90C31 Sensitivity, stability, parametric optimization
58E35 Variational inequalities (global problems) in infinite-dimensional spaces

Keywords:

optimization problems with variational inequalities constraints; parametric variational inequalities; well-posedness

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