D-GAP FUNCTIONS FOR VARIATIONAL INEQUALITIES OVER PRODUCT SETS*

I. V. Konnov (Kazan University, Kazan)
E.O. Volotskaya (Kazan University, Kazan)

Let $G : R^n \to R^n$ be a continuously differentiable mapping. The *mixed variational inequality problem* (MVI) is the problem of finding a point $x^* \in K = \prod_{i=1}^{n} K_i$ such that

$$G(x^*)^T(x - x^*) + \sum_{i=1}^{n}[f_i(x_i) - f_i(x_i^*)] \geq 0 \quad \forall x \in K, \qquad (*)$$

where $f_i : R \to R$ is a convex, but not necessarily differentiable function, $i = 1, \ldots, n$. There are a lot of problems in Mathematical Physics, Economics and Operations Research which are involved in this class of MVI's. In order to find a solution to $(*)$, we suggest to apply D-gap functions, which enables one to convert $(*)$ into the problem of finding a stationary point of a differentiable function [1]. Therefore, one can find a solution to MVI with the help of the usual differentiable optimization methods. Due to the decomposable structure of MVI, each iteration of such methods involves only solutions of one-dimensional convex auxiliary problems. We give examples of applications of the approach above to general economic and oligopolistic equilibrium problems.

R e f e r e n c e

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