An Interior Proximal Method for Solving Pseudomonotone Nonlipschitzian Multivalued Variational Inequalities

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Abstract: Multivalued variational inequalities, shortly MVI, can be formulated as follows

$$\text{Find } x^* \in C, w^* \in F(x^*) \text{ such that } \langle w^*, x - x^* \rangle \geq 0 \quad \forall x \in C$$

where $C := \{x \in R^n | \ Ax \leq b\}$, A is an $p \times n$ matrix, $b \in R^p, p \geq n$. We suppose that the matrix A is of maximal rank, i.e., rank$A = n$ and that int$C = \{x | \ Ax < b\}$ is nonempty. Let $F : C \to 2^{R^n}$ be a multivalued operator.

In this paper we extend our recent results in [1, 2, 3] to MVI. We present a new and efficient method for solving pseudomonotone nonlipschitzian multivalued variational inequalities on polyhedra. The method is based on the special interior-quadratic function which replaces the usual quadratic function. This leads to an interior proximal type algorithm. The algorithm can be viewed as combining line search techniques and the special interior-quadratic function. The convergence analysis of the algorithm is considered. An application to variational inequalities is discussed. Some numerical test problems are implemented by using MATLAB with encouraging effectiveness.

[1] Anh P. N., *A logarithmic quadratic regularization method for solving pseudomonotone equilibrium problems*, Acta Mathematica Vietnamica, April 2008, accepted.
[2] Anh P. N., *An LQP regularization method for equilibrium problems on polyhedra*, Vietnam Journal of Mathematics, Vol 36 (2008), 209-228.
[3] Anh P. N., Muu L. D., and Strodiot J. J., *Generalized Projection Method for Non-Lipschitz Multivalued Monotone Variational Inequalities*, Acta Mathematica Vietnamica, 2008, accepted.

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