

COMPUTING THE FIXED-POINTS OF GENERAL MIXED VARIATIONAL INEQUALITIES

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Abstract. In this paper, we suggest and analyze a class of predictor-corrector methods for computing the fixed-points of general mixed variational inequalities. The convergence of the proposed methods only requires the partially relaxed strongly monotonicity of the operator, which is weaker than co-coercivity. As special cases, we obtain a number of known and new results for solving various classes of variational inequalities and related problems.

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REFERENCES

- [1] A. S. ANTIPIN, *Iterative gradient prediction-type methods for computing fixed points of extremal mapping*, Parametric Optimization and Related Topics IV. (eds. J. Guddat, H. Th. Jongen, F. Nizicka, G. Still and F. Twitt), Peter Lang, Frankfurt am Main, (1997), 11–24.
- [2] R. W. COTTLE, F. GIANNESI AND J. L. LIONS, *Variational Inequalities and Complementarity Problems: Theory and Applications*, J. Wiley and Sons, New York, 1980.
- [3] F. GIANNESI AND A. MAUGERI, *Variational Inequalities and Network Equilibrium Problems*, Plenum Press, New York, 1995.
- [4] R. GLOWINSKI, J. L. LIONS AND R. TRÉMOLIÈRES, *Numerical Analysis of Variational Inequalities*, North-Holland, Amsterdam, 1981.
- [5] J. L. LIONS AND G. STAMPACCHIA, *Variational inequalities*, Comm. Pure Appl. Math. **20** (1967), 493–512.
- [6] Z. NANIEWICZ AND P. D. PANAGIOTOPOULOS, *Mathematical Theory of Hemivariational Inequalities and Applications*, Marcel Dekker, New York, 1995.
- [7] M. ASLAM NOOR, *A class of new iterative methods for general mixed variational inequalities*, Math. Computer Modelling, **31** (2000), 11–19.
- [8] M. ASLAM NOOR, *Algorithms for general monotone mixed variational inequalities*, J. Math. Anal. Appl. **229** (1999), 330–343.
- [9] M. ASLAM NOOR, *General variational inequalities*, Appl. Math. Letters **1** (1988), 119–121.
- [10] M. ASLAM NOOR, *Wiener-Hopf equations and variational inequalities*, J. Optim. Theory Appl. **79** (1993), 197–206.
- [11] M. ASLAM NOOR, *An extraresolvent method for monotone mixed variational inequalities*, Math. Computer Modelling **29** (1999), 95–100.
- [12] M. ASLAM NOOR, *Some recent advances in variational inequalities, Part I, basic concepts*, New Zealand J. Math. **26** (1997), 53–80.
- [13] M. ASLAM NOOR, *Some recent advances in variational inequalities, Part II, other concepts*, New Zealand J. Math. **26** (1997), 229–255.
- [14] M. ASLAM NOOR, *Some algorithms for general monotone mixed variational inequalities*, Math. Computer Modelling **29** (7) (1999), 1–9.
- [15] M. ASLAM NOOR, *A new predictor-corrector method for noncoercive mixed variational inequalities*, Korean J. Comput. Appl. Math. **7** (2) (2000), 363–371.

- [16] G. STAMPACCHIA, *Formes bilineaires coercivites sur les ensembles convexes*, C. R. Acad. Sci. Paris, **258** (1964), 4413–4416.
- [17] P. TSENG, *A modified forward–backward splitting method for maximal monotone mappings*, SIAM J. Control Optim. **38** (2000), 431–446.
- [18] D. L. ZHU AND P. MARCOTTE, *An extended descent framework for variational inequalities*, J. Optim. Theory Appl. **80** (1994), 349–366.