

AUXILIARY PRINCIPLE TECHNIQUE FOR SOLVING GENERALIZED SET-VALUED NONLINEAR QUASI-VARIATIONAL-LIKE INEQUALITIES

NAN-JING HUANG AND YA-PING FANG

Abstract. In this paper, we introduce and study a new class of generalized set-valued nonlinear quasi-variational-like inequalities in Hilbert spaces and construct some iterative algorithms to compute the approximating solutions of this class of generalized set-valued nonlinear quasi-variational-like inequalities by using the auxiliary principle technique. We also give the convergence analysis of the iterative sequences generated by the algorithms. The results presented in this paper extend and improve the corresponding results announced by Ding.

Mathematics subject classification (2000): 49A29, 49J40, 47H10.

Key words and phrases: Quasi-variational-like inequality; Auxiliary principle technique; Iterative algorithm; Convergence.

REFERENCES

- [1] R. P. AGARWAL, Y. J. CHO, N. J. HUANG, Sensitivity analysis for strongly nonlinear quasi-variational inclusions, *Appl. Math. Lett.* **13**(6) (2000), 19–24.
- [2] S. S. CHANG, N. J. HUANG, Generalized strongly nonlinear quasi-complementarity problems in Hilbert spaces, *J. Math. Anal. Appl.* **158** (1991), 194–202.
- [3] X. P. DING, Existence and algorithm of solutions for generalized mixed implicit quasi-variational inequalities, *Appl. Math. Comput.* **113** (2000), 67–80.
- [4] R. GLOWINSKI, J. L. LIONS, R. TREMOLIERES, *Numerical Analysis of Variational Inequalities*, North-Holland, Amsterdam, 1981.
- [5] N. J. HUANG, On the generalized implicit variational inequalities, *J. Math. Anal. Appl.* **216** (1997), 197–210.
- [6] N. J. HUANG, M. R. BAI, Y. J. CHO, S. M. KANG, Generalized nonlinear mixed quasi-variational inequalities, *Comput. Math. Appl.* **40**(2–3) (2000), 205–215.
- [7] N. J. HUANG, Y. P. LIU, Y. Y. TANG, M. R. BAI, On the generalized set-valued strongly nonlinear implicit variational inequalities, *Comput. Math. Appl.* **37**(10) (1999), 29–36.
- [8] S. B. NADLER, Jr. Multi-valued contraction mappings, *Pacific J. Math.* **30** (1969), 475–487.
- [9] M. A. NOOR, Nonlinear quasi-complementarity problems, *Appl. Math. Lett.* **2**(3) (1989), 251–254.
- [10] D. PASCALI, S. SBURLAN, *Nonlinear Mapping of Monotone Type*, Sijthoff & Noordhoff, The Netherlands, 1978.
- [11] S. H. SHIM, S. M. KANG, N. J. HUANG, Y. J. CHO, Perturbed iterative algorithms with errors for completely generalized strongly nonlinear implicit quasivariational inclusions, *J. Inequal. Appl.* **5**(4) (2000), 381–395.
- [12] A. H. SIDDIQI, Q. H. ANSARI, Strongly nonlinear quasi-variational inequalities, *J. Math. Anal. Appl.* **149**(2) (1990), 444–450.
- [13] J. C. YAO, Existence of generalized variational inequalities, *Oper. Res. Lett.* **15** (1994), 35–40.
- [14] GEORGE X. Z. YUAN, *KKM Theory and Applications in Nonlinear Analysis*, Marcel Dekker, New York, 1999.