

SPLIT FEASIBILITY AND FIXED POINT PROBLEMS FOR ASYMPTOTICALLY k -STRICT PSEUDO-CONTRACTIVE MAPPINGS IN INTERMEDIATE SENSE

QAMRUL HASAN ANSARI*, AISHA REHAN** AND JEN-CHIH YAO***

*Department of Mathematics, Aligarh Muslim University, Aligarh 202002, India
and Department of Mathematics, King Fahd University of Petroleum and Minerals, Dhahran,
Saudi Arabia,

E-mail: qhansari@gmail.com

**Department of Mathematics, Aligarh Muslim University, Aligarh 202002, India

E-mail: aishashaheen370@gmail.com

***Center for General Education, China Medical University, Taichung, Taiwan 40402, R.O.C; and
Department of Mathematics, King Abdulaziz University, P.O. Box 80203, Jeddah 21589, Saudi
Arabia

E-mail: yaojc@mail.cmu.edu.tw

Abstract. This paper deals with the weak convergence of the relaxed extragradient method with regularization for computing a common element of the solution set of split feasibility problem and the fixed points set of a asymptotically k -strict pseudo-contractive mapping in intermediate sense. A numerical example is provided to illustrate the main result of this paper.

Key Words and Phrases: Split feasibility problems; Fixed point problems; Relaxed extragradient method; Asymptotically k -strict pseudo-contractive mappings in intermediate sense; Convergence analysis.

2010 Mathematics Subject Classification: 49J40, 49J52, 47J20, 47H10.

REFERENCES

- [1] Q.H. Ansari, *Topics in Nonlinear Analysis and Optimization*, World Education, Delhi, 2012.
- [2] Q.H. Ansari, C.S. Lalitha, M. Mehta, *Generalized Convexity, Nonsmooth Variational Inequalities, and Nonsmooth Optimization*, CRC Press, Taylor & Francis Group, Boca Raton, London, New York, 2014.
- [3] Q.H. Ansari, A. Rehan, *Split feasibility and fixed point problems*, Nonlinear Analysis: Approximation Theory, Optimization and Applications, (Ed. Q.H. Ansari), Birkhäuser, Springer, New Delhi, Heidelberg, New York, London, 2014, 281-322.
- [4] C. Byrne, *Block iterative methods for image reconstruction from projections*, IEEE Trans. Image. Process., **5**(1996), 96-103.
- [5] C. Byrne, *Iterative oblique projection onto convex subsets and the split feasibility problem*, Inverse Probl., **18**(2002), 441-453.
- [6] C. Byrne, *A unified treatment of some iterative algorithms in signal processing and image reconstruction*, Inverse Probl., **20**(2004), 103-120.
- [7] L.-C. Ceng, Q.H. Ansari, J.-C. Yao, *An extragradient method for solving split feasibility and fixed point problems*, Computat. Math. Appl., **64**(2012), 633-642.

- [8] L.-C. Ceng, Q.H. Ansari, J.-C. Yao, *Relaxed extragradient method for solving split feasibility and fixed point problem*, *Nonlinear Anal.*, **75**(2012), 2116-2125.
- [9] L.-C. Ceng, Q.H. Ansari, J.-C. Yao, *Mann type iterative methods for finding a common solution of split feasibility and fixed point problems*, *Positivity*, **16**(2012), 471-495.
- [10] Y. Censor, T. Bortfeld, B. Martin, A. Trofimov, *A unified approach for inversion problems in intensity-modulated radiation therapy*, *Phys. Med. Biol.*, **51**(2006), 2353-2365.
- [11] J. Deepho, P. Kumam, *Split feasibility and fixed-point problems for asymptotically quasi-nonexpansive*, *Fixed Point Theory Appl.*, **2013**(2013), Article ID 322.
- [12] K. Geobel, W.A. Kirk, *Topics in Metric Fixed Point Theory*. Cambridge Studies in Advanced Mathematics, **28**, Cambridge University Press, Cambridge, 1990.
- [13] T.H. Kim, H.-K. Xu, *Strong convergence of modified Mann iterations for asymptotically strict pseudo-contraction*, *Nonlinear Anal.*, **68**(2008), 2828-2836.
- [14] M.O. Osilike, S.C. Aniagbosor, *Weak and strong convergence theorems for fixed points of asymptotically nonexpansive mappings*, *Math. Computat. Model.*, **32**(2000), 1181-1191.
- [15] Z. Opial, *Weak convergence of the sequence of successive approximations for nonexpansive mappings*, *Bull. Amer. Math. Soc.*, **73**(1967), 591-597.
- [16] L. Qihou, *Iterative sequence for asymptotically quasi-nonexpansive mappings*, *J. Math. Anal. Appl.*, **259**(2001), 1-7.
- [17] R.T. Rockafellar, *On the maximality of sums of nonlinear monotone operators*, *Trans. Amer. Math. Soc.*, **149**(1970), 75-88.
- [18] D.R. Sahu, H.-K. Xu, J.-C. Yao, *Asymptotically strict pseudo-contractive mappings in the intermediate sense*, *Nonlinear Anal.*, **70**(2009), 3502-3511,
- [19] H.-K. Xu, *Iterative methods for the split feasibility problem in infinite-dimensional Hilbert spaces*, *Inverse Probl.*, **26**(2010), Article ID 105018, 17 pp.

Received: December 12, 2014; Accepted: May 28, 2015.