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CONVERGENCE THEOREMS BASED ON THE SHRINKING PROJECTION METHOD FOR HEMI-RELATIVELY NONEXPANSIVE MAPPINGS, VARIATIONAL INEQUALITIES AND EQUILIBRIUM PROBLEMS

ZI-MING WANG¹, MI KWANG KANG² AND YEOL JE CHO^{3*}

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ABSTRACT. In this paper, we introduce a new hybrid projection algorithm based on the shrinking projection methods for two hemi-relatively nonexpansive mappings. Using the new algorithm, we prove some strong convergence theorems for finding a common element in the fixed points set of two hemi-relatively nonexpansive mappings, the solutions set of a variational inequality and the solutions set of an equilibrium problem in a uniformly convex and uniformly smooth Banach space. Furthermore, we apply our results to finding zeros of maximal monotone operators. Our results extend and improve the recent ones announced by Li [J. Math. Anal. Appl. 295 (2004) 115–126], Fan [J. Math. Anal. Appl. 337 (2008) 1041–1047], Liu [J. Glob. Optim. 46 (2010) 319–329], Kamraks and Wangkeeree [J. Appl. Math. Comput. DOI: 10.1007/s12190-010-0427-2] and many others.

¹ DEPARTMENT OF FOUNDATION, SHANDONG YINGCAI UNIVERSITY, JINAN 250104, P.R. CHINA

E-mail address: wangziming1983@yahoo.com.cn

² DEPARTMENT OF MATHEMATICS, DONGEUI UNIVERSITY, PUSAN 614-714, KOREA,

E-mail address: mee@deu.ac.kr

³ DEPARTMENT OF MATHEMATICS EDUCATION AND THE RINS, GYEONGSANG NATIONAL UNIVERSITY, CHINJU 660-701, KOREA

E-mail address: yjcho@gnu.ac.kr

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* Corresponding author.

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