Weak and Strong Convergence Theorems of Common Fixed Points for a Pair of Nonexpansive and Asymptotically Nonexpansive Mappings ^{*}

ZEQING LIU¹, RAVI P. AGARWAL², CHI FENG³, SHIN MIN KANG⁴

¹Department of Mathematics, Liaoning Normal University, P. O. Box 200, Dalian, Liaoning 116029, People's Republic of China e-mail: zeqingliu@dl.cn

²Department of Applied Mathematics, Florida Institute of Technology, Melbourne, FL 32901-6988, USA e-mail: aqarwal@fit.edu

³Department of Science, Dalian Fisheries College, Dalian, Liaoning 116023, People's Republic of China

⁴Department of Mathematics and RINS, Gyeongsang National University, Chinju 660-701, Korea e-mail: smkang@nongae.gsnu.ac.kr

(Received November 18, 2004)

Abstract

The purpose of this paper is to establish some weak and strong convergence theorems of modified three-step iteration methods with errors with respect to a pair of nonexpansive and asymptotically nonexpansive mappings in uniformly convex Banach spaces. The results presented in this paper generalize, improve and unify a few results due to Chang [1], Liu and Kang [5], Osilike and Aniagbosor [7], Rhoades [8] and Schu [9], [10] and others. An example is included to demonstrate that our results are sharp.

Key words: Nonexpansive mappings, asymptotically nonexpansive mappings, common fixed points, modified three-step iteration methods with errors with respect to a pair of mappings.

2000 Mathematics Subject Classification: 47H05, 47H10, 47H15

 $^{^*{\}rm This}$ work was supported by the Science Research Foundation of Educational Department of Liaoning Province (2004C063).