CONVERGENCE THEOREMS FOR A FINITE FAMILY OF NONEXPANSIVE AND TOTAL ASYMPTOTICALLY NONEXPANSIVE MAPPINGS

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Abstract
In this paper, we define and study strong convergence of finite step iteration sequences with errors to a common fixed point for a pair consisting of a finite family of nonexpansive mappings and a finite family of total asymptotically nonexpansive mappings in a nonempty closed convex subset of uniformly convex Banach spaces. The results of this paper can be viewed as an improvement and extension of the corresponding results of F. Gu and Z. He (Multi-step iterative process with errors for common fixed points of a finite family of nonexpansive mappings, Math. Commun. 11 (1), 47–54, 2006), Z. Liu, R. P. Agarwal, C. Feng, and S. M. Kang (Weak and strong convergence theorems of common fixed points for a pair of nonexpansive and asymptotically nonexpansive mappings, Acta Univ. Palack. Olomuc. Fac. Rer. Nat. Math. 44, 83–96, 2005), Z. Liu, C. Feng, J. S. Ume and S. M. Kang (Weak and strong convergence for common fixed points for a pair of nonexpansive and asymptotically nonexpansive mappings, Taiwanese J. Math. 11, 27–42, 2007), S. Saejung and K. Sitthikul (Weak and strong convergence theorems for a finite family of nonexpansive and asymptotically nonexpansive mappings in Banach spaces, Thai J. Math. Special Issue, 15–26, 2008) and others.

Keywords: Total asymptotically nonexpansive mappings, Common fixed point, Uniformly convex Banach space, Finite-step iteration scheme with errors with respect to a pair of mappings.

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