TWO ALGORITHMS FOR NONEXPANSIVE MAPPINGS

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Abstract. We study two algorithms for approximating fixed points of nonexpansive mappings in Banach spaces. One of them is implicit and the other is explicit. We prove strong convergence theorems for both of them.

Key Words and Phrases: Banach space, fixed point, iterative algorithm, nonexpansive mapping.

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References

[1] F. E. Browder, *Semicontractive and semiaccretive nonlinear mappings in Banach spaces*, Bull. Amer. Math. Soc., **74**(1968), 660-665.

[2] K. Goebel and S. Reich, *Uniform Convexity, Hyperbolic Geometry, and Nonexpansive Mappings*, Marcel Dekker, New York and Basel, 1984.

[3] E. Kopecká and S. Reich, *Nonexpansive retracts in Banach spaces*, Banach Center Publ., **77**(2007), 161-174.

[4] S. Reich, *An iterative procedure for constructing zeros of accretive sets in Banach spaces*, Nonlinear Anal., **2**(1978), 85-92.

[5] S. Reich, *Strong convergence theorems for resolvents of accretive operators in Banach spaces*, J. Math. Anal. Appl., **75**(1980), 287-292.

[6] S. Reich, *On the asymptotic behavior of nonlinear semigroups and the range of accretive operators*, J. Math. Anal. Appl., **79**(1981), 113-126.

[7] S. Reich, *A nonlinear Hille-Yosida theorem in Banach spaces*, J. Math. Anal. Appl., **84**(1981), 1-5.

[8] Y. Shehu and J.N. Ezeora, *Path convergence and approximation of common zeroes of a finite family of m-accretive mappings in Banach spaces*, Abstr. Appl. Anal., **2010**(2010), Article ID 285376, 14 pp.

[9] T. Suzuki, *Strong convergence of approximated sequences for nonexpansive mappings in Banach spaces*, Proc. Amer. Math. Soc., **135** (2007), 99-106.

[10] H.-K. Xu, *Viscosity approximation methods for nonexpansive mappings*, J. Math. Anal. Appl., **298**(2004), 279-291.

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[11] Y. Yao, Y.C. Liou and G. Marino, *Strong convergence of two iterative algorithms for nonexpansive mappings in Hilbert spaces*, Fixed Point Theory Appl., **2009**(2009), Article ID 279058, 7 pp.