

WEAK ORTHOGONALITY AND SUZUKI NONEXPANSIVE-TYPE MAPPINGS

ANNA BETIUK-PILARSKA

Institute of Mathematics, Maria Curie-Skłodowska University
20-031 Lublin, Poland
E-mail: abetiuk@hektor.umcs.lublin.pl

Abstract. It is shown that if X is a weakly orthogonal Banach lattice, K is a nonempty weakly compact and convex subset of X and $T : K \rightarrow K$ satisfies condition (C) or is continuous and satisfies condition (C_λ) for some $\lambda \in (0, 1)$, then T has a fixed point. This generalizes Sims's result from [11].
Key Words and Phrases: Nonexpansive mapping, fixed point, weakly orthogonal lattice, mapping satisfying condition (C) .

2010 Mathematics Subject Classification: 47H10, 46B20, 47H09.

Acknowledgement. The author thanks Andrzej Wiśnicki for helpful discussions.

REFERENCES

- [1] A. Betiuk-Pilarska, A. Wiśnicki, *On the Suzuki nonexpansive-type mappings*, Ann. Funct. Anal., **4**(2013), no. 2, 7286.
- [2] T. Butsan, S. Dhompongsa, W. Takahashi, *A fixed point theorem for pointwise eventually nonexpansive mappings in nearly uniformly convex Banach spaces*, Nonlinear Anal., **74**(2011), 1694-1701.
- [3] J. Borwein, B. Sims, *Non-expansive Mappings on Banach lattices and related topics*, Houston J. of Math., **10**(1984), 339-355.
- [4] S. Dhompongsa, A. Kaewcharoen, *Fixed point theorems for nonexpansive mappings and Suzuki-generalized nonexpansive mappings on a Banach lattice*, Nonlinear Anal., **71**(2009), 5344-5353.
- [5] T. Domínguez Benavides, *A renorming of some nonseparable Banach spaces with the fixed point property*, J. Math. Anal. Appl., **350**(2009), 525-530.
- [6] J. García Falset, E. Lloréns Fuster, T. Suzuki, *Fixed point theory for a class of generalized nonexpansive mappings*, J. Math. Anal. Appl., **375**(2011), 185-195.
- [7] K. Goebel, *On the structure of minimal invariant sets for nonexpansive mappings*, Ann. Univ. Mariae Curie-Skłodowska Sect. A, **29**(1975), 73-77.
- [8] L.A. Karlovitz, *Existence of fixed points of nonexpansive mappings in a space without normal structure*, Pacific J. Math., **66**(1976), 153-159.
- [9] W.A. Kirk, B. Sims (Eds.), *Handbook of Metric Fixed Point Theory*, Kluwer Academic Publ., Dordrecht, 2001.
- [10] E. Lloréns Fuster, E. Moreno Gálvez, *The fixed point theory for some generalized nonexpansive mappings*, Abstr. Appl. Anal., 2011, Art. ID 435686, 15 pp.
- [11] B. Sims, *Orthogonality and fixed points of nonexpansive maps*, Proc. Centre Math. Austral Nat. Univ., **20**(1988), 178-186.
- [12] M.A. Khamsi, W.A. Kirk, *An Introduction to Metric Spaces and Fixed Point Theory*, A Wiley-Interscience Publication, New York, 2001.

- [13] T. Suzuki, *Fixed point theorems and convergence theorems for some generalized nonexpansive mappings*, J. Math. Anal. Appl., **340**(2008), 1088-1095.

Received: March 27, 2013; Accepted: November 15, 2013.