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ROTATIVE FIRMLY LIPSCHITZIAN MAPPINGS IN BANACH SPACES

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Abstract. In 2005, J. Górnicki and K. Pupka gave conditions providing existence of fixed points for k-lipschitzian ($k > 1$) mappings in a Banach space which are n-rotative with $n \geqslant 3$. In the paper, using the same method, we study the existence of fixed points of rotative mappings in certain subclass of lipschitzian mappings, i.e. firmly lipschitzian mappings in order to obtain better estimates of Lipschitz constant k. We also show that $\mathrm{Fix}(T)$ is a Hölder continuous retract of C.
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References

[1] R.E. Bruck, *Nonexpansive projections on subsets of Banach spaces*, Pacific J. Math., **48**(1973), 341-357.
[2] K. Goebel, M. Koter, *Regularly nonexpansive mappings*, Annals Univ. "Al. I. Cuza" Iaşi, **24**(1978), 265-269.
[3] K. Goebel, M. Koter, *A remark on nonexpansive mappings*, Canadian Math. Bull., **24**(1981), 113-115.
[4] K. Goebel, M. Koter, *Fixed points of rotative lipschitzian mappings*, Rend. Sem. Mat. Fis. Milano, **51**(1981), 145-156.
[5] J. Górnicki, *Fixed points of involutions*, Math. Japonica **43**(1996), no. 1, 151-155.
[6] J. Górnicki, *Remarks an fixed points of rotative Lipschitzian mappings*, Comment. Math. Univ. Carolinae, **40**(1999), 495-510.
[7] J. Górnicki, K. Pupka, *Fixed points of rotative mappings in Banach spaces*, J. Nonlinear and Convex Analysis, **6**(2005), no. 2, 217-233.
[8] B. Halpern, *Fixed points of nonexpansive maps*, Bull. Amer. Math. Soc., **73**(1967), 957-961.
[9] Y.-M. Hong, Y.-Y. Huang, *On λ-firmly nonexpansive mappings in nonconvex sets*, Bull. Inst. Math. Acad. Sinica, **21**(1993), 35-42.
[10] W. Kaczor, *Fixed points of λ-firmly nonexpansive mappings on nonconvex sets*, Nonlinear Anal., **47**(2001), 2787-2792.
[11] W. Kaczor, M. Koter-Mórgowska, *Firmly lipschitzian mappings*, Annals Univ. Marie Curie - Sklodowska, **2**(1996), 77-85.
[12] W.A. Kirk, *A fixed point theorem for mappings with a nonexpansive iterate*, Proc. Amer. Math. Soc., **29**(1971), 294-298.
[13] W.A. Kirk, B. Sims (eds.), *Handbook of Metric Fixed Point Theory*, Kluwer Acad. Publ., Dordrecht, 2001.

[14] M. Koter, *Fixed points of lipschitzian 2-rotative mappings*, Boll. Un. Mat. Ital. Ser. VI, **5**(1986), 321-339.
[15] M. Koter-Mórgowska, *Rotative mappings in Hilbert space*, J. Nonlinear and Convex Anal., **1**(2000), no. 3, 295-304.
[16] V. Perez Garcia, H. Fetter Nathansky, *Fixed points of periodic mappings in Hilbert spaces*, Annals Univ. Marie Curie-Sklodowska, **64**(2010), no. 2, 37-48.
[17] R. Smarzewski, *On firmly nonexpansive mappings*, Proc. Amer. Math. Soc., **113**(1991), 723-725.

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