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σ-POROUS SETS OF GENERALIZED NONEXPANSIVE MAPPINGS

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Abstract. In the paper we show that many generic results obtained in the last 40 years in the field of fixed point theory, are consequences of one general theorem. As an application we get some extensions of them and we study the generic aspect of the existence of attractors of nonexpansive IFSs. We also give a detailed discussion on the relationship between two results obtained by De Blasi and Myjak, and Reich and Zaslavski.
Key Words and Phrases: Fixed points, porosity, nonexpansive mappings, contractive mappings, set-valued mappings, measures of noncompactness.
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References

[1] J. Appell, *Measures of noncompactness, condensing operators and fixed points: an application-oriented survey*, Fixed Point Theory, **6**(2005), no. 2, 157-229.
[2] M.F. Barnsley, *Fractals Everywhere*, Academic Press Professional, Boston, MA, 1993.
[3] T. Domínguez Benavides, J. Carmona Alvárez, *Porosity and K-set contractions*, Boll. Un. Mat. Ital. A, **6**(7)(1992), no. 2, 227-232.
[4] F. De Blasi, J. Myjak, *Sur la porosité de l'ensemble des contractions sans point fixe*, C.R. Acad. Sci. Paris, **308**(1989), 51-54.
[5] F. De Blasi, J. Myjak, S. Reich, A. Zaslavski, *Generic existence and approximation of fixed points for nonexpansive set-valued maps*, Set Valued Anal., **17**(2009), no. 1, 97-112.
[6] J. Hutchinson, *Fractals and self-similarity*, Indiana Univ. Math. J., **30**(1981), no. 5, 713-747.
[7] J. Jachymski, I. Jóźwik, *Nonlinear contractive conditions: a comparison and related problems*, Banach Center Publ., 77, Polish Acad. Sci., **77**(2007), 123-146.
[8] M.A. Khamsi, *Sadovskiĭ's fixed point theorem without convexity*, Nonlinear Anal., **53**(2003), 829-837.
[9] E. Rakotch, *A note on contractive mappings*, Proc. Amer. Math. Soc., **13**(1962), 459-465.
[10] S. Reich, A. Zaslavski, *Almost all nonexpansive mappings are contractive,* C.R. Math. Acad. Sci. Soc. R. Can., **22**(2000), no. 3, 118-124.
[11] S. Reich, A. Zaslavski, *The set of noncontractive mappings is σ-porous in the space of all nonexpansive mappings,* C.R. Acad. Sci. Paris Sér. I Math., **333**(2001), no. 6, 539-544.

[12] S. Reich, A. Zaslavski, *Generic aspects of metric fixed point theory*, Handbook of Metric Fixed Point Theory, Kluwer Acad. Publ., Dordrecht, 2001, 557-575.
[13] S. Reich, A. Zaslavski, *Convergence of iterates of nonexpansive set-valued mappings*, Set Valued Mappings with Applications in Nonlinear Analysis, Ser. Math. Anal. Appl., **4**, Taylor & Francis, London, 2002, 411-420.
[14] B.N. Sadovskiĭ, *On a fixed point principle*, (Russian) Funkcional. Anal. i Priložen., **1**(1967), no. 2, 74-76.
[15] L. Zajíček, *Porosity and σ-porosity*, Real Anal. Exchange, **13**(1987/1988), no. 2, 314-350.
[16] L. Zajíček, *On σ-porous sets in abstract spaces*, Abstr. Appl. Anal., **5**(2005), 509-534.

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