

## ZBĂGANU CONSTANT AND NORMAL STRUCTURE

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**Abstract.** The aim of this paper is to give sufficient conditions for the normal structure of a Banach space, involving the so-called Zbăganu constant  $C_Z(X)$  which is a quadratic one introduced in [8] in order to characterize the inner product spaces.

**Key Words and Phrases:** Normal structure, fixed point property, von Neumann-Jordan constant, Zbaganu constant.

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### REFERENCES

- [1] W.A. Kirk, *A fixed point theorem for mappings which do not increase distances* Amer. Math. Monthly, **72**(1965), 1004-1006.
- [2] K. Goebel and W.A. Kirk, *Topics in Metric Fixed Point Theory*, Cambridge Univ. Press, 1990.
- [3] S. Prus, *Geometrical Background of Metric Fixed Point Theory*, in Handbook of Metric Fixed Point Theory, W. A. Kirk and B. Sims (eds.), Kluwer Academic Publ. 2001, 93-132.
- [4] J. García-Falset, E. Llorens-Fuster, E. Mazcuñán Navarro, *Uniformly nonsquare Banach spaces have the fixed point property for nonexpansive mappings*, J. Funct. Anal., **233**(2006), 494-514.
- [5] S. Dhompongsa, A. Kaewkao, S. Tasena, *On a generalized James constant*, J. Math. Anal. Appl., **285**(2003), 419-435.
- [6] S. Dhompongsa, A. Kaewkhao, *A note on properties that imply the fixed point property*, Abstract and Applied Analysis, Volume 2006, Art. ID 34959, 12 pp.
- [7] S. Saejung, *On James and von Neumann-Jordan constants and sufficient conditions for the fixed point property*, J. Math. Anal. Appl., **323**(2006), 1018-1024.
- [8] G. Zbăganu, *An inequality of M. Rădulescu and S. Rădulescu which characterizes the inner product spaces*, Rev. Roumaine Math. Pures Appl., **47**(2002), 253-257.

- [9] J. Alonso and P. Martín, *A Counterexample for a Conjecture of G. Zbăganu about the Neumann-Jordan Constant*, Revue Roumaine Math. Pur. Appl., **51**(2006), 135-141.
- [10] B. Sims, *Orthogonality and fixed points of nonexpansive maps*. Proc. Center Austral. Math. Nat. Univ. **20**(1988), 179-186.
- [11] B. Sims, *A class of spaces with weak normal structure*, Bull. Austral. Math. Soc., **50**(1994), 523-528.
- [12] M. Kato, L. Maligranda and Y. Takahashi, *On Janes and Jordan-von Neumann constants and the normal structure coefficient of Banach spaces*, Studia Math., **144**(2001), 275-295.
- [13] J. Banas, K. Fraczek, *Deformation of Banach spaces*, Comment. Math. Univ. Carolinae, **34**(1993), 47-53.
- [14] W.L. Bynum, *Normal structure coefficients for normal structure for Banach spaces*, Pacific J. of Math., **86**(1980), 427-436.
- [15] J. Ayerbe Toledano, T. Domínguez Benavides, G. López Acedo, *Measures of Noncompactness in Metric Fixed Point Theory*, Birkhäuser, Op. Th., Vol 99., 1997.
- [16] J. Gao, *Normal hexagons and more Banach spaces with uniform normal structure*, Journal of Mathematics, **20**(2000), 241-248.
- [17] A. Jiménez Melado, E. Llorens-Fuster, S. Saejung, *The von Neumann-Jordan constant, weak orthogonality and normal structure in Banach spaces*, Proc. Amer. Mat. Soc., **134**(2006), 355-364.

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