JORDAN–VON NEUMANN TYPE CONSTANT AND FIXED POINTS FOR MULTIVALUED NONEXPANSIVE MAPPINGS

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Abstract. We give some sufficient conditions for the Domínguez-Lorenzo condition in terms of the Jordan-von Neumann type constant, and the coefficient of weak orthogonality. As a consequence, we obtain some sufficient conditions for normal structure and fixed point theorems for multivalued nonexpansive mappings. These fixed point theorems improve some previous results in the recently papers.

REFERENCES

[1] J. ALONSO AND P. MARTÍN, *A counterexample to a conjecture of G. Zbăganu about the Neumann-Jordan constant*, Rev. Roumaine Math. Pures Appl. **51** (2006), no. 2, 135–141.

[2] J. A. CLARKSON, *The von Neumann-Jordan constant for the Lebesgue spaces*, Ann. of Math. (2) **38** (1937), no. 1, 114–115.

[3] S. DHOMPONGSA, P. PIRAISANGJUN, AND S. SAEJUNG, *Generalised Jordan-von Neumann constants and uniform normal structure*, Bull. Austral. Math. Soc. **67** (2003) 225–240.

[4] S. DHOMPONGSA, A. KAEWKHAO, AND S. TASENA, *On a generalized James constant*, J. Math. Anal. Appl. **285** (2003) 419–435.

[5] S. DHOMPONGSA, A. KAEWCHAROEN, A. KAEWKHAO, *The Domínguez-Lorenzo condition and multivalued nonexpansive mappings*, Nonlinear Anal. **64** (2006) 958–970.

[6] S. DHOMPONGSA, T. DOMÍNGUEZ BENAVIDES, A. KAEWCHAROEN, A. KAEWKHAO, B. PANYANAK, *The Jordan-von Neumann constant and fixed points for multivalued nonexpansive mappings*, J. Math. Anal. Appl. **320** (2006) 916–927.

[7] J. GAO AND K.-S. LAU, *On two classes of Banach spaces with uniform normal structure*, Studia Math. **99** (1) (1991) 41–56.

[8] A. JIMÉNEZ-MELADO, E. LLORENS-FUSTER, AND S. SAEJUNG, *The von Neumann-Jordan constant, weak orthogonality and normal structure in Banach spaces*, Proc. Amer. Math. Soc. **134** (2006) 355–364.

[9] A. KAEWKHAO, *The James constant, the Jordan-von Neumann constant, weak orthogonality and fixed points for multivalued mappings*, J. Math. Anal. Appl. **333** (2) (2007) 950–958.

[10] W. A. KIRK, *A fixed point theorem for mappings which do not increase distances*, Amer. Math. Monthly **72** (1965) 1004–1006.

[11] S. B. NADLER JR., *Multivalued contraction mappings*, Pacific J. Math. **30** (1969) 475–488.

[12] 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.

[13] B. SIMS, *Orthogonality and fixed points of nonexpansive maps*, in: Proc. Centre Math. Anal. Austral. Nat. Univ, Austral. Nat. Univ, Canberra, (1988), 178–186.

[14] Y. TAKAHASHI, *Some geometric constants of Banach spaces–a unified approach*, in: Banach and Function Spaces II, Proc. International Symposium (ISBFS 2006) held in Kitakyushu (Sept. 14–17, 2006), Edited by Mikio Kato and Lech Maligranda, Yokohama Publ., Yokohama 2008, 191–220.

[15] C. S. YANG AND Y. M. WANG, *Some properties on Jordan-von Neumann type constant of Banach spaces*, Acta Mathematica Scientia, 2012, **32A** (1): 212–221.

[16] G. ZBĂGANU, *An inequality of M. Radulescu and S. Radulescu which characterizes the inner product spaces*, Rev. Roumaine Math. Pures Appl. **47** (2) (2002), 253–257.

[17] ZHANFEI ZUO, YUNAN CUI, *A coefficient related to some geometrical properties of Banach space*, Journal of Inequalities and Applications, Volume 2009 (2009), Article ID 934321.

[18] ZHANFEI ZUO, *An Application of Zbǎganu Constant in Fixed Point Theory*, Acta Mathematica Vietnamica Volume 37, Number 1, 2012, 71–77.

[19] ZHANFEI ZUO, *The Ptolemy constant of absolute normalized norms on R^2*, Journal of Inequalities and Applications, 2012, 1–14.

[20] ZHANFEI ZUO, YUNAN CUI, *Some modulus and normal structure in Banach space*, Journal of Inequalities and Applications, Volume 2009 (2009), Article ID 676373.

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