Dedicated to Professor Emeritus Ioan A. Rus on the occasion of his 80th anniversary

Retraction method in fixed point theory for monotone nonexpansive mappings

M. R. ALFURAIDAN

ABSTRACT.

In this paper we study the properties of the common fixed points set of a commuting family of monotone nonexpansive mappings in Banach spaces endowed with a graph. In particular, we prove that under certain conditions, this set is a monotone nonexpansive retract.

REFERENCES

[1] Alfuraidan, M. R., *Fixed points of monotone nonexpansive mappings with a graph*, Fixed Point Theory Appl., (2015), 2015:49, DOI 10.1186/s13663-015-0299-0

[2] Aronszajn, N. and Panitchpakdi, P., *Extension of uniformly continuous transformations and hyperconvex metric spaces*, Pacific J. Math., **6** (1956), 405–439

[3] Bachar, M. and Khamsi, M. A., *Fixed points of monotone mappings and application to integral equations*, Fixed Point Theory Appl., 2015, 2015:110, DOI:10.1186/s13663-015-0362-x

[4] Borsuk, K., *Sur les rétractes*, Fundam. Math., **17** (1931), 152–170

[5] Browder, F. E., *Nonexpansive nonlinear operators in a Banach space*, Proc. Nat. Acad. Sci. U.S.A., **54** (1965), 1041–1044

[6] Bruck, R. E., *Properties of fixed point sets of non-expansive mappings in Banach spaces*, Trans. Amer. Math. Soc., **179** (1973), 251–262

[7] Göhde, D., *Zum Prinzip der kontraktiven Abbildung*, Math. Nachr., **30** (1965), 251–258

[8] Granas, A. and Dugundji, J., *Fixed point theory. Springer Monographs in Mathematics*, Springer-Verlag, New York, 2003, xvi+690 pp. ISBN: 0-387-00173-5

[9] Jachymski, J., *The Contraction Principle for Mappings on a Metric Space with a Graph*, Proc. Amer. Math. Soc., **136** (2007), 1359–1373

[10] Johnsonbaugh, R., *Discrete Mathematics*, Prentice-Hall, Inc., New Jersey, 1997

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

[12] Klee, V. L., *Stability of the fixed point property*, Colloq. Math., **8** (1961), 43–46

[13] Ran, A. C. M. and Reurings, M. C. B., *A fixed point theorem in partially ordered sets and some applications to matrix equations*, Proc. Amer. Math. Soc., **132** (2004), 1435–1443

[14] Rival, I., *A fixed point theorem for finite partially ordered sets*, J. Combin. Theory, **21** (1976) 309–318

[15] Rival, I., *The problem of fixed points in ordered sets*, in: M. Deza and I. G. Rosenberg, eds., Annals of Discrete Mathematics, Vol. **8** (North-Holland, Amsterdam, 1980) 283–292

[16] Rus, I. A., *The generalized retraction methods in fixed point theory for nonself operators*, Fixed Point Theory, **15** (2014), No. 2, 559–578

[17] Rus, I. A. *Retraction method in the fixed point theory in ordered structures*, Seminar on Fixed Point Theory, 1–8, Preprint, 88–3, Univ. "Babes-Bolyai", Cluj-Napoca, 1988

[18] Tychonoff, A. N., *ber die topologische Erweiterung von Rumen*, Mathematische Annalen (in German) **102** (1930), No. 1, 544–561, doi:10.1007/BF01782364

DEPARTMENT OF MATHEMATICS & STATISTICS
KING FAHD UNIVERSITY OF PETROLEUM AND MINERALS
DHAHRAN 31261, SAUDI ARABIA
E-mail address: monther@kfupm.edu.sa