

FIXED POINT THEOREMS IN KASAHARA SPACES WITH RESPECT TO AN OPERATOR AND APPLICATIONS

ALEXANDRU-DARIUS FILIP

Babeş-Bolyai University, Department of Applied Mathematics
 Kogălniceanu Street, No. 1, 400084 Cluj-Napoca, Romania.
 E-mail: darius.filip@econ.ubbcluj.ro

Abstract. The purpose of this paper is to introduce the concept of Kasahara space with respect to an operator and to prove in this setting some fixed point theorems. As applications, integral and differential equations are considered.

Key Words and Phrases: Kasahara space with respect to an operator, fixed point, sequence of successive approximations, graphic contraction, Picard operator, weakly Picard operator, data dependence, well-posedness, shadowing property.

2010 Mathematics Subject Classification: 47H10, 54H25.

Acknowledgment. The author wish to thank for the financial support provided from programs co-financed by The Sectoral Operational Programme Human Resources Development, Contract POSDRU 6/1.5/S/3 "Doctoral studies: through science towards society".

REFERENCES

- [1] M. Fréchet, *Les espaces abstraits*, Gauthier-Villars, Paris, 1928.
- [2] S. Hu and N.S. Papageorgiou, *Handbook of Multivalued Analysis. Vol. I. Theory; Vol. II. Applications*, Kluwer Acad. Publ., Dordrecht, 1997 and 1999.
- [3] S. Kasahara, *On some generalizations of the Banach contraction theorem*, Publ. RIMS, Kyoto Univ., **12**(1976), 427-437.
- [4] M.G. Maia, *Un'osservazione sulle contrazioni metriche*, Rend. Sem. Mat. Univ. Padova, **40**(1968), 139-143.
- [5] P. Pavel and I.A. Rus, *Ecuatii diferențiale și integrale*, EDP București, 1975.
- [6] R. Precup *A fixed point theorem of Maia type in syntopogenous spaces*, Seminar on Fixed Point Theory, 1988, 49-70.
- [7] A. Petrusel and I.A. Rus, *Fixed point theory for multivalued operators on a set with two metrics*, Fixed Point Theory, **8**(2007), 97-104.
- [8] I.A. Rus, *Data dependence of the fixed points in a set with two metrics*, Fixed Point Theory, **8**(2007), 115-123.
- [9] I.A. Rus, *Metric space with fixed point property with respect to contractions*, Studia Univ. Babeş-Bolyai Math., **51**(2006), 115-121.
- [10] I.A. Rus, *On a fixed point theorem of Maia*, Studia Univ. Babeş-Bolyai Math., **22**(1977), 40-42.
- [11] I.A. Rus, *Generalized Contractions and Applications*, Cluj Univ. Press, Cluj-Napoca, 2001.
- [12] I.A. Rus, *Picard operators and applications*, Sci. Math. Japon., **58**(2003), 191-219.
- [13] I.A. Rus, *Kasahara spaces*, Sci. Math. Jpn., **72**(2010), No.1, 101-110.

- [14] I.A. Rus, A. Petruşel and M.A. Şerban, *Weakly Picard operators: equivalent definitions, applications and open problems*, Fixed Point Theory, **7**(2006), 3-22.
- [15] I.A. Rus and M.A. Şerban, *Some generalizations of a Cauchy lemma and applications*, Topics in Mathematics, Computer Science and Philosophy, A Festschrift for Wolfgang W. Breckner, 173-181.
- [16] I.A. Rus, *The theory of a metrical fixed point theorem: theoretical and applicative relevance*, Fixed Point Theory, **9**(2008), 541-559.
- [17] I.A. Rus, A. Petruşel, G. Petruşel, *Fixed Point Theory*, Cluj University Press Cluj-Napoca, 2008.

Received: January 22, 2010; Accepted: June 12, 2010.