

ON GREGUS-ĆIRIĆ MAPPINGS ON WEIGHTED GRAPHS

MONTHER RASHED ALFURAIDAN* AND MOHAMED AMINE KHAMSI**

*Department of Mathematics & Statistics
King Fahd University of Petroleum and Minerals
Dhahran 31261, Saudi Arabia
E-mail: monther@kfupm.edu.sa

**Department of Mathematical Sciences
University of Texas at El Paso
El Paso, TX 79968, USA
E-mail: mohamed@utep.edu

Abstract. In this paper, we introduce the concept of monotone Gregus-Ćirić-contraction mappings in weighted digraphs. Then we establish a fixed point theorem for monotone Gregus-Ćirić-contraction mappings defined in convex weighted digraphs.

Key Words and Phrases: Fixed point, Gregus-Ćirić-contraction, monotone mappings, weighted graph.

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REFERENCES

- [1] M.R. Alfuraidan, *On monotone Ćirić quasi-contraction mappings with a graph*, Fixed Point Theory Appl., 2015(2015), 93.
- [2] M. Bachar, M.A. Khamsi, *On monotone Ćirić quasi-contraction mappings*, J. Math. Ineq., **10**(2016), no. 2, 511–19.
- [3] S. Banach, *Sur les opérations dans les ensembles abstraits et leurs applications*, Fund. Math., **3**(1922), 133–181.
- [4] L.M. Blumenthal, *Theory and Applications of Distance Geometry*, Oxford Univ. Press, London, 1953.
- [5] Lj. B. Ćirić, *A generalization of Banach's contraction principle*, Proc. Amer. Math. Soc., **45**(1974), 267–273.
- [6] Lj. B. Ćirić, *On a generalization of Gregus fixed point theorem*, Czechoslovak. Math. J., **50**(2000), 449–458.
- [7] B. Djafari-Rouhani, S. Moradi, *On the existence and approximation of fixed points for Ćirić type contractive mappings*, Quaestiones Math., **37**(2014), no. 2, 179–189.
- [8] M. Gregus Jr., *A fixed point theorem in Banach space*, Boll. Un. Mat. Ital. Sez. A Mat.Soc. Cult., **80**(517)(1980), 193–198.
- [9] J. Jachymski, *The contraction principle for mappings on a metric space with a graph*, Proc. Amer. Math. Soc., **136**(2008), 1359–1373.

- [10] K. Menger, *Untersuchungen über allgemeine Metrik*, Math. Ann., **100**(1928), 75–163.
- [11] A.C.M. Ran, M.C.B. Reurings, *A fixed point theorem in partially ordered sets and some applications to matrix equations*, Proc. Amer. Math. Soc., **132**(2004), no. 5, 1435–1443.
- [12] S. Reich, I. Shafrir, *Nonexpansive iterations in hyperbolic spaces*, Nonlinear Anal., **15**(1990), 537–558.
- [13] W. Takahashi, *A convexity in metric spaces and nonexpansive mappings*, Kodai Math. Sem. Rep., **22**(1970), 142–149.

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