

RELATION THEORETIC METRICAL FIXED POINT THEOREMS WITH AN APPLICATION

Javid ALI

Department of Mathematics, Aligarh Muslim University Aligarh
202002, India. E-mail: javid@amu.ac.in

Abstract: In this paper, we establish metrical relation-theoretic fixed point theorems via an implicit contractive condition which is general enough to yield a multitude of corollaries corresponding to several well known contraction conditions (e.g. Banach (Fund. Math. 3, 133-181 (1922)), Kannan (Am. Math. Mon. 76, 405-408 (1969)), Reich (Can. Math. Bull. 14, 121-124 (1971)), Bianchini (Boll. Unione Mat. Ital. 5, 103-108 (1972)), Chatterjea (C. R. Acad. Bulg. Sci. 25, 727-730 (1972)), Hardy and Rogers (Can. Math. Bull. 16, 201-206 (1973)), Ciric (Proc. Am. Math. Soc. 45, 267-273 (1974)) and several others) wherein even such corollaries are new results on their own. As simple we utilize our main results, to prove a theorem on the existence and uniqueness of the solution of an integral equation besides furnishing an illustrative example.

Keywords: Complete metric space, binary relations, implicit relations, fixed point.

References:

- (1) A. Alam, M. Imdad, "Relation-theoretic contraction principle", J. Fixed Point Theory Appl., 17(2015), 693-702.
- (2) J. Ali, M. Imdad, "An implicit function implies several contraction conditions", Sarajevo J. Math., 4(17)(2008), 269-285.
- (3) V. Berinde, F. Vetro, "Common fixed points of mappings satisfying implicit contractive conditions", Fixed Point Theory Appl., 2012:105.
- (4) J.J. Nieto, R.R. Lopez, "Contractive mapping theorems in partially ordered sets and application to ordinary differential equations", Order, 22(3)(2008), 223-239.