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PPF DEPENDENT FIXED POINTS OF CONTRACTIVE TYPE MAPPINGS

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Abstract. We introduce generalized Kannan, generalized Chatterjea, and generalized Kannan and Chatterjea type mappings and weakly Chatterjea contractive type mappings which are non-self mappings defined on a Banach space of all continuous functions with the range space is a Banach space and prove the existence and uniqueness of PPF dependent fixed points of these mappings. We provide examples in support of our results.

Keywords. PPF dependent fixed point, Razumikhin class, generalized Kannan type mapping, generalized Chatterjea type mapping, generalized Kannan and Chatterjea type mapping, weakly Chatterjea contractive type mapping.

AMS (MOS) Subject Classification: 47H10, 54H25.

1 Introduction

Fixed point theory plays an important role in nonlinear analysis and its applications. In 1922, the Polish mathematician Banach[5] established the existence and uniqueness of a fixed point of a contraction map in complete metric spaces and this result is known as Banach contraction principle. The Banach contraction principle is one of the basic and important tool which provides an idea for proving the existence of solutions of ordinary differential equations and integral equations and for solving various problems in mathematical science and engineering. Thereafter, Chatterjea[8], Kannan[12] and Reich[17] proved different types of fixed point theorems in complete metric spaces.

Several authors extended, generalized and improved Banach fixed point theorem in different ways. In 1968, Kannan[12] defined a mapping known as Kannan mapping and he proved the existence and uniqueness of fixed point in a complete metric space. Several years later, in 1972, Chatterjea[8] also defined a mapping known as Chatterjea mapping and he proved the existence and uniqueness of fixed point in a complete metric space, for more details we refer [1, 3, 15, 16].