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FG-coupled Fixed Point Theorems for Contractive Type Mappings in Partially Ordered Metric Spaces

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ABSTRACT: In this paper we prove FG-coupled fixed point theorems for Kannan, Reich and Chatterjea type mappings in partially ordered complete metric spaces using mixed monotone property.

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Keywords and Phrases: FG-coupled fixed point; Mixed monotone property; Contractive type mappings; Partially ordered space.

1. Introduction and Preliminaries

Banach contraction theorem is one of the fundamental theorems in metric fixed point theory. Banach proved existence of unique fixed point for a self contraction in complete metric space. Since the contractions are always continuous, Kannan introduced a new type of contractive map known as Kannan mapping [8] and proved analogues results of Banach contraction theorem. The importance of Kannan mapping is that it can be discontinuous and it characterizes completeness of the space [14, 15]. In [11] Reich introduced a new type of contraction which is a generalization of Banach contraction and Kannan mapping and proved existence of unique fixed point in complete metric spaces. Later Chatterjea defined a contraction similar to Kannan mapping known as Chatterjea mapping [4] and proved various fixed point results. Inspired by these contractions, several authors did research in this area using different spaces and by weakening the contraction conditions [2, 7, 9, 12].

The concept of coupled fixed point was introduced by Guo and Lakshmikantham [6]. They proved fixed point theorems using mixed monotone property in cone spaces.