

FIXED POINT THEOREMS FOR FOUR MAPPINGS IN METRIC SPACES

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Abstract: In this paper, we present a common fixed point theorem for weak compatible mapping of type (A) for four mappings in metric space which generalizes the result of Kang and Kim [6].

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1. Introduction

In Jungck [1] and in all generalization of Jungck's theorems, families of commuting mappings have been considered. Rhoades, Sessa and Khan [8] improved the results by assuming weak commutativity. Further, Jungck, Murthy and Cho [4] introduced the concept of compatible mappings of type (A) in metric space and improved the results of various authors. We use the idea of weak compatible mappings of type (A) in metric space as used by Pathak, Kang and Beak [7] in Menger and 2-metric spaces respectively which is equivalent to the concept of compatible and compatible mappings of type (A) under some conditions. In this section, we present a common fixed point theorem for weak compatible mapping of type (A) for four mappings in a metric space which generalizes the result of Kang and Kim [6].

2. Preliminaries

Definition 2.1. The pair (A, S) is said to be weak compatible of type (A) if

$$\lim_{n \rightarrow \infty} d(ASx_n, SSx_n) \leq \lim_{n \rightarrow \infty} d(SAx_n, SSx_n)$$

and

$$\lim_{n \rightarrow \infty} d(SAx_n, AAx_n) \leq \lim_{n \rightarrow \infty} d(ASx_n, AAx_n)$$

whenever $\{x_n\}$ is a sequence in X such that $\lim_{n \rightarrow \infty} Sx_n = t = \lim_{n \rightarrow \infty} Ax_n$ for some $t \in X$.