F-Contraction Type Mappings in 0-Complete Partial Metric Spaces

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Abstract

In this paper we define the F-contraction type mapping and prove the existence of fixed point theorem for F-contractive mappings defined on 0-complete partial metric spaces.

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1 Introduction

The notion of partial metric space has been introduced by Matthews [2] in 1994 as a part of the study of denotational semantics of dataflow network. In partial metric space, the usual distance was replaced by partial metric, with an interesting porperty nonzero self-distance of points.

Recently, Wardowski [4] introduced a new concept of F-contraction and proved a fixed point theorem which generalizes the Banach contraction principle in a different way than the known results of the literature on complete metric space.

Definition 1.1. [1] A partial metric on a nonempty set X is a function $p : X \times X \longrightarrow [0, \infty)$ such that for all $x, y, z \in X$,
$(P1)$ $x = y$ iff $p(x, x) = p(x, y) = p(y, y)$,
$(P2)$ $p(x, x) \leq p(x, y)$,
$(P3)$ $p(x, y) = p(y, x)$,
$(P4)$ $p(x, y) \leq p(x, z) + p(z, y) - p(z, z)$.

A partial metric space is a pair (X, p) such that X is a nonempty set and p is a partial metric on X.

Suppose that p is a partial metric on X, then it can be shown that the function $p^s : X \times X \longrightarrow [0, \infty)$ is given by

$$p^s(x, y) = 2p(x, y) - p(x, x) - p(y, y)$$

is a metric on X.

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