



COUPLED FIXED POINTS IN PARTIAL METRIC SPACES

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Communicated by Vladimir I. Pulov

We study the existence and the location of coupled fixed points for a composition of two pseudo-contractive-type set-valued mappings in the setting of partial metric spaces by using Bianchini-Grandolfi gauge functions.

MSC: 47H10, 54H25

Keywords: Fixed point theorem, partial metric space, set-valued mapping

1. Introduction and Preliminaries

Partial metric spaces are generalization of usual metric spaces in which the self-distance for any point need not be equal to zero. The motivation behind introducing the concept of a partial metric space is to present a version of the Banach fixed point theorem to solve some problems in computer science. Banach and Nadler fixed point results, for single valued and set-valued mappings are of particular importance and play a fundamental role in nonlinear analysis. In fact, it is hard to overestimate their applicability and importance in mathematics. Among other applications, they are used to show the existence of solutions to differential equations, as well as the existence of equilibria in game theory.

In 1994, Dontchev and Hager [6] presented a fixed point theorem for set-valued mappings in complete metric space speaking about the location of a fixed point with respect to an initial value of the set-valued mapping.

A generalization of their result using Bianchini-Grandolfi gauge functions is presented in [9, Theorem 3.1]. Another version of this theorem in the setting of partial metric spaces is presented in [2, Theorem 3.2]. In [1] this result is extended to a coupled fixed point theorem in partial metric spaces.

The main purpose of this paper is to prove the existence of coupled fixed points for a composition of two set-valued mappings in complete partial metric spaces.

We start by recalling some basic definitions and properties in partial metric spaces.