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Research Article

Fixed Point Results in Quasimetric Spaces

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In the setting of quasimetric spaces, we prove some new results on the existence of fixed points for contractive type maps with respect to Q-function. Our results either improve or generalize many known results in the literature.

1. Introduction and Preliminaries

Let X be a metric space with metric d. We use $S(X)$ to denote the collection of all nonempty subsets of $X, Cl(X)$ for the collection of all nonempty closed subsets of $X, CB(X)$ for the collection of all nonempty closed bounded subsets of X, and H for the Hausdorff metric on $CB(X)$, that is,

$$H(A,B) = \max\left\{\sup_{a\in A} d(a,B), \sup_{b\in B} d(b,A)\right\}, \quad A,B \in CB(X), \tag{1.1}$$

where $d(a,B) = \inf\{d(a,b) : b \in B\}$ is the distance from the point a to the subset B.

For a multivalued map $T : X \to CB(X)$, we say

$(a)T$ is *contraction* [1] if there exists a constant $\lambda \in (0,1)$, such that for all $x, y \in X$,

$$H(T(x),T(y)) \leq \lambda d(x,y), \tag{1.2}$$

(b)T is *weakly contractive* [2] if there exist constants $h, b \in (0,1)$, $h < b$, such that for any $x \in X$, there is $y \in I_b^x$ satisfying

$$d(y,T(y)) \leq hd(x,y), \tag{1.3}$$

where $I_b^x = \{y \in T(x) : bd(x,y) \leq d(x,T(x))\}$.