COUPLED COINCIDENCE POINT THEOREMS FOR NONLINEAR CONTRACTIONS UNDER C-DISTANCE IN CONE METRIC SPACES

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ABSTRACT. In this paper, among others, we prove the following results:
(1) Let (X, d) be a complete cone metric space partially ordered by $\sqsubseteq$ and q be a c-distance on X. Suppose $F : X \times X \to X$ and $g : X \to X$ be two continuous and commuting functions with $F(X \times X) \subseteq g(X)$. Let F satisfy mixed g-monotone property and $q(F(x, y), F(u, v)) \preceq \frac{k}{2}(q(gx, gu) + q(gy, gv))$ for some $k \in [0, 1)$ and all $x, y, u, v \in X$ with $(gx \sqsubseteq gu)$ and $(gy \sqsupseteq gv)$ or $(gx \sqsupseteq gu)$ and $(gy \sqsubseteq gv)$. If there exist $x_0, y_0 \in X$ satisfying $gx_0 \sqsubseteq F(x_0, y_0)$ and $F(y_0, x_0) \sqsubseteq gy_0$, then there exist $x^*, y^* \in X$ such that $F(x^*, y^*) = gx^*$ and $F(y^*, x^*) = gy^*$, that is, F and g have a coupled coincidence point (x^*, y^*). (2) If, in (1), we replace completeness of (X, d) by completeness of $(g(X), d)$ and commutativity, continuity of mappings F and g by the condition: (i) for any nondecreasing sequence $\{x_n\}$ in X converging to x we have $x_n \sqsubseteq x$ for all n. (ii) for any nonincreasing sequence $\{y_n\}$ in Y converging to y we have $y \sqsubseteq y_n$ for all n, then F and g have a coupled coincidence point (x^*, y^*).

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