

Jungck, Gerald

Compatible mapping and common fixed points. (English) Zbl 0613.54029
Int. J. Math. Math. Sci. 9, 771-779 (1986).

The author obtains common fixed point theorems for collections of mappings satisfying certain contractive type conditions in complete metric spaces. These results extend a number of earlier ones primarily by replacing commutativity assumptions with a weaker "compatibility" assumption. Self-mappings f and g of a metric space (X, d) are compatible if $\lim_n d(g(f(x_n)), f(g(x_n))) = 0$ whenever $\{x_n\}$ is a sequence in X such that $\lim_n f(x_n) = \lim_n g(x_n) = t$ for some $t \in X$. This definition implies that f and g commute on the set $\{x \in X : f(x) = g(x)\}$.

A typical corollary of the results obtained is the following: Let S and T be self-maps of a complete metric space (X, d) and let $A, B: X \rightarrow S(X) \cap T(X)$. Suppose that S and T are continuous and that the pairs A, S and B, T are compatible. If there exists $r \in (0, 1)$ such that $d(Ax, By) \leq rd(Sx, Ty)$, $x, y \in X$, then A, B, S , and T have a unique common fixed point.

Reviewer: W.A.Kirk

MSC:

54H25 Fixed-point and coincidence theorems (topological aspects)

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Keywords:

common fixed point; complete metric spaces; compatibility" assumption

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