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Stability results for fixed point iteration procedures. (English) Zbl 0655.47045

Math. Jap. 33, No. 5, 693-706 (1988).

Let (X, d) be a metric spaces and $T : X \rightarrow X$ a mapping. Let $x_{n+1} = f(T, x_n)$, $x_0 \in X$ be an iteration procedure such that $(x_n)_{n \geq 0}$ converges to a fixed point p of T . Let $(y_n)_{n \geq 0}$ be an arbitrary sequence in X and set $a_n = d(y_{n+1}, f(T, y_n))$ for $n \in \mathbb{N}$. By definition if $\lim_{n \rightarrow \infty} a_n = 0$ implies that $\lim_{n \rightarrow \infty} y_n = p$, then the iteration procedure $x_{n+1} = f(T, x_n)$ is said to be stable with respect to T . Stability results are established for three iteration procedures with respect to some kind of generalized contractions. Some examples are given.

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MSC:

[47H10](#) Fixed-point theorems

[47H09](#) Contraction-type mappings, nonexpansive mappings, A -proper mappings, etc.

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

[65D15](#) Algorithms for approximation of functions

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Keywords:

[iteration procedure](#); [Stability results](#); [generalized contractions](#)