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Correction: A fixed point theorem for cyclic generalized contractions in metric spaces. *Fixed Point Theory and Applications* 2012, **2012**:122

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Abstract

The purpose of this short note is to present some corrections and clarifications concerning the proof of the main result given in the above mentioned paper.

Concerning the text and the proof of the main result (Theorem 2.2), we would like to do the following corrections and clarifications:

(1) In Theorem 2.2, an additional hypothesis is needed, namely:

3. There exists $y_1 \in Y$ such that

$$d(y_1, f^n(y_1)) < +\infty \quad \text{for all } n \in \mathbb{N}^*.$$

(2) On page 3, the fact that the sequence $(c_n)_{n \in \mathbb{N}}$ is bounded follows now from the above mentioned hypothesis, using the following remark: by 3., for each $x \in Y$, we have that

$$d(x, f^n(x)) < +\infty \quad \text{for all } n \in \mathbb{N}^*.$$

Indeed, let $n \in \mathbb{N}^*$ and suppose that $y_1 \in A_1$. Let $x \in A_l$ (where $l \in \{1, \dots, m\}$). Let us choose $u_2 \in A_2, \dots, u_{l-1} \in A_{l-1}$. Then

$$\begin{aligned} d(x, f^n(x)) &\leq d(x, y_1) + d(y_1, f^n(y_1)) + d(f^n(y_1), f^n(x)) \\ &\leq d(x, y_1) + d(y_1, f^n(y_1)) + d(f^n(y_1), f^n(u_2)) + \dots + d(f^n(u_{l-1}), f^n(x)) \leq \dots \\ &\leq d(x, y_1) + d(y_1, f^n(y_1)) + d(y_1, u_2) + \dots + d(u_{l-1}, x) < +\infty. \end{aligned}$$

(3) On page 5, to prove that the Picard iteration converges to x^* , we have to do as follows.

Let us show now that the Picard iteration converges to x^* for any initial point x_1 . We know that f has a unique fixed point (denoted by x^*) and the sequence $(x_n)_{n \in \mathbb{N}}$ converges to a certain $y \in \bigcap_{i=1}^m A_i$. We will show that y is also a fixed point of f . For this purpose, we

have

$$d(y, f(y)) \leq d(y, x_{n+1}) + d(f(x_n), f(y)) \leq d(y, x_{n+1}) + d(y, x_n) \rightarrow 0 \quad \text{as } n \rightarrow \infty.$$

This shows that y is a fixed point of f and, thus, $y = x^*$.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

All authors contributed equally and significantly in writing this article. All authors read and approved the final manuscript.

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