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ERRATUM TO: FIXED POINTS OF (ψ,ϕ) − ALMOST WEAKLY CONTRACTIVE MAPS IN FUZZY METRIC SPACES

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After examining the proofs of the main results in [1] we noticed some crucial errors. In this note, we correct some errors that appeared in article [1] by slightly modifying the inequality condition given in definition 3.1. of [1].

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In Definition 3.1, Inequality (8) should be modified as

(8) $\psi(M(Tx,Ty,t)) \leq \psi(M(x,y,t)) - \phi(M(x,y,t)) + L\{1-m(x,y)\}\ \forall\, x,y \in X, t>0, L \geq 0.$

where $m(x,y) = max\{M(x,y,t), M(Tx,x,t), M(Tx,y,t), M(Ty,x,t), M(Ty,y,t)\}$

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$$(3.2.1)\qquad \psi(M(x_n,x_{n+1},t)) = \psi(M(Tx_{n-1},Tx_n,t)) \leq \psi(M(x_{n-1},x_n,t)) - \phi(M(x_{n-1},x_n,t)) + L\{1-m(x_{n-1},x_n)\}$$

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$$m(x_{n-1},x_n) = max\left\{\begin{array}{r}M(x_{n-1},x_n,t),M(Tx_{n-1},x_{n-1},t),M(Tx_{n-1},x_n,t),M(Tx_n,x_{n-1},t),\\ M(Tx_n,x_n,t)\end{array}\right\}$$

$$= max\{M(x_{n-1},x_n,t),M(x_n,x_{n-1},t),M(x_n,x_n,t),M(x_{n+1},x_{n-1},t),M(x_{n+1},x_n,t)\}$$

$$= max\{M(x_n,x_{n-1},t),1,M(x_{n+1},x_{n-1},t),M(x_{n+1},x_n,t)\}$$

$$= 1$$

(3.2.2) $$m(x_{n-1},x_n) = 1$$

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(3.2.4) $$\psi(M(x_n,x_{n+1},t)) < \psi(M(x_{n-1},x_n,t))$$

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Let $\lim_{n\to\infty} M(x_n,x_{n+1},t) = r$ then taking limit as $n\to\infty$ in (3.2.3) $\implies \psi(r) \leq \psi(r) - \phi(r)$

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Consider $\psi(M(x_{n_k},x_{m_k},t)) = \psi(M(Tx_{n_k-1},Tx_{m_k-1},t))$

(3.2.13) $$\leq \psi(M(x_{n_k-1},x_{m_k-1},t)) - \phi(M(x_{n_k-1},x_{m_k-1},t)) + L\{1-m(x_{n_k-1},x_{m_k-1})\}$$

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(3.2.16)

$$m(x_{n_k-1},x_{m_k-1}) = max\left\{\begin{array}{r}M(x_{n_k-1},x_{m_k-1},t),M(Tx_{n_k-1},x_{n_k-1},t),M(Tx_{n_k-1},x_{m_k-1},t),\\ M(Tx_{m_k-1},x_{n_k-1},t),M(Tx_{m_k-1},x_{m_k-1},t)\end{array}\right\}$$

$$= max\left\{\begin{array}{r}M(x_{n_k-1},x_{m_k-1},t),M(x_{n_k},x_{n_k-1},t),M(x_{n_k},x_{m_k-1},t),\\ M(x_{m_k},x_{n_k-1},t),M(x_{m_k},x_{m_k-1},t)\end{array}\right\}$$

(3.2.17) $$\therefore m(x_{n_k-1},x_{m_k-1}) \to 1 \text{ as } k \to \infty$$

Using (3.2.12), (3.1.14), (3.1.15)and (3.2.17), equation (3.2.13) becomes

$$\psi(M(x_{n_k},x_{m_k},t)) \leq \psi(1-\varepsilon) - \phi(1-\varepsilon) + L\{1-m(x_{n_k-1},x_{m_k-1})\}$$

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$$\psi(M(x_n,Tz,t)) = \psi(M(Tx_{n-1},Tz,t))$$

(3.2.18) $$\leq \psi(M(x_{n-1},z,t)) - \phi(M(x_{n-1},z,t)) + L\{1-m(x_{n-1},z)\}$$

where $m(x_{n-1},z) = max\begin{Bmatrix} M(x_{n-1},z,t), M(Tx_{n-1},x_{n-1},t), M(Tx_{n-1},z,t), M(Tz,x_{n-1},t), \\ M(Tz,z,t) \end{Bmatrix}$

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as n $\rightarrow \infty$, (3.2.18) becomes

$$\psi(M(z,Tz,t)) \leq \psi(M(z,z,t)) - \phi(M(z,z,t)) + L\{1-1\} = \psi(1) - \phi(1) = 0$$

$$\therefore \psi(M(z,Tz,t)) = 0 \implies M(z,Tz,t) = 1$$

Thus, Tz = z $\implies$ z is a fixed point of T in X.

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$$\psi(M(z,w,t)) = \psi(M(Tz,Tw,t)) \leq \psi(M(z,w,t)) - \phi(M(z,w,t)) + L\{1-m(z,w)\}$$

$$= \psi(M(z,w,t)) - \phi(M(z,w,t)) + L\{0\} \ (\because m(z,w) = 1)$$

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Example . ***(Example 3.3. of*** [1]***)*** : Let X = [0, 1] and $*$ be the continuous t-norm defined by a $*$ b = ab. $M(x,y,t) = \begin{cases} 1, & \text{if either x = 0 or y = 0} \\ \frac{min\{x,y\}}{max\{x,y\}} & \text{if } x \neq 0 \text{ and } y \neq 0 \end{cases}$. Then, Clearly (X, M, $*$) is a complete fuzzy metric space. Let $T: X \rightarrow X$ be defined by $Tx = \begin{cases} 0 & \text{if } x = \frac{1}{2} \\ 1 & \text{if } x \in [0, \frac{1}{2}) \cup (\frac{1}{2}, 1] \end{cases}$

Let ψ and ϕ on (0, 1] be defined by ψ(s) = 1 - s^2 and ϕ(s) = 1 - s. Here, T satisfies the inequality (8) with any L $\geq$ 0.

$\therefore$ T is a (ψ, ϕ) - almost weakly contractive map on X. Thus, T satisfies all the hypothesis of Theorem 3.2. and so, have a unique fixed point in X i.e., at x = 1.

REFERENCES

[1] Manthena Prapoorna, Manchala Rangamma, Fixed Points of (ψ, ϕ) - almost weakly contractive maps in fuzzy metric spaces, Adv. Fixed Point Theory, 6 (4) (2016), 387-396