Chatterjea - type fixed point theorem on cone rectangular metric spaces with Banach algebras

Abba Auwalu[1,2], Ali Denker[2]

[1] *Sule Lamido University Kafin Hausa, Nigeria*

abba.auwalu@slu.edu.ng, abba.auwalu@neu.edu.tr

[2] *Near East University Nicosia, Turkey*

ali.denker@neu.edu.tr, adenker63@gmail.com

Abstract: In this paper, we established the prove of a new Chatterjea - type fixed point theorem in Cone rectangular metric spaces over Banach algebras as follows:

Let (K, η) be a complete cone rectangular metric space over Banach algebra B with a unit e and S be a solid cone in B. Suppose that the mapping $J : K \to K$ satisfies the contractive condition:

$$\eta(Jx, Jy) \preccurlyeq \gamma[\eta(Jx, y) + \eta(Jy, x)],$$

for all $x, y \in K$, where $\gamma \in S$ such that the spectral radius $\delta(\gamma) < 1/2$. Then J has a unique fixed point x_* in K. Moreover, for any point $x_0 \in K$, the iterative sequence $\{J^i x_0\}$ $(i \in \mathbb{N})$ converges to x_*.

Keywords: Cone rectangular metric space; contraction; fixed point; Banach algebras

2010 Mathematics Subject Classification: 47H10, 54H25, 35J08, 35J25

References

[1] D. Dey, M. Saha, Partial cone metric space and some fixed point theorems, TWMS J. App. Eng. Math. 3(1), 1 - 9, 2013.

[2] S. Shukla, S. Balasubramanian, and M. Pavlovic, A generalized Banach fixed point theorem, Bull. Mal. Math. Sci. Soc. 39, 1529 - 1539, 2016.

[3] A. Auwalu, A. Denker, Cone rectangular metric spaces over Banach algebras and fixed point results of T-contraction mappings, Fourth International Conference on Analysis and Applied Mathematics (ICAAM), Nicosia - Cyprus, 2018.