

COMMON FIXED POINT THEOREMS IN C*-ALGEBRA-VALUED B-METRIC SPACES WITH APPLICATIONS TO INTEGRAL EQUATIONS

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Abstract. Based on the concepts of C*-algebra-valued b-metric space, we give some common fixed point results in C*-algebra-valued b-metric space. As an application, existence and uniqueness result for one type of integral equations is also discussed.

Key Words and Phrases: Fixed point, b-metric space, C*-algebra, common fixed point, compatible, weakly compatible.

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REFERENCES

- [1] M. Abbas, G. Jungck, *Common fixed point results for noncommuting mappings without continuity in cone metric spaces*, J. Math. Anal. Appl., **341**(2008), 416-420.
- [2] M.T. Abu Osman, *Fuzzy metric space and fixed fuzzy set theorem*, Bull. Malaysian Math. Soc., **6**(2)(1983), 1-4.
- [3] A. Amini-Harandi, H. Emami, *A fixed point theorem for contraction type maps in partially ordered metric spaces and application to ordinary differential equations*, Nonlinear Anal., **72**(5)(2010), 2238-2242.
- [4] I.A. Bakhtin, *The contraction mapping principle in almost metric spaces*, Funct. Anal., **30**(1989), 26-37.
- [5] V. Berinde, *A common fixed point theorem for compatible quasi contractive self mappings in metric spaces*, Appl. Math. Comput., **213**(2009), no. 2, 348-354.
- [6] M. Boriceanu, M. Bota, A. Petruşel, *Multivalued fractals in b-metric spaces*, Central Eur. J. Math., **8**(2010), no. 2, 367-377.
- [7] B.S. Choudhury, N. Metiya, *The point of coincidence and common fixed point for a pair of mappings in cone metric spaces*, Appl. Math. Comput., **60**(2010), no. 6, 1686-1695.
- [8] L.B. Ćirić, B. Samet, H. Aydi, C. Vetro, *Common fixed points of generalized contractions on partial metric spaces and an application*, Appl. Math. Comput., **218**(2011), no. 6, 2398-2406.
- [9] G. Cortelazzo, G. Milan, G. Vezzi, P. Zamoeroni, *Trademark shapes description by string matching techniques*, Pattern Recognit., **27**(1994), no. 8, 1005-1018.

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- [10] S. Czerwik, *Contraction mappings in b-metric spaces*, Acta Math. Inform. Univ. Ostrava, **1**(1993), 5-11.
- [11] S. Czerwik, *Nonlinear set-valued contraction mappings in b-metric spaces*, Atti Sem. Mat. Fis. Univ. Modena, **46**(1998), no. 2, 263-276.
- [12] R.G. Douglas, *Banach Algebra Techniques in Operator Theory*, Acad. Press, **46**(1972).
- [13] J. Esmaily, S.M. Vaezpour, B.E. Rhoades, *Coincidence point theorem for generalized weakly contractions in ordered metric spaces*, Appl. Math. Comput., **219**(2012), no. 4, 1536-1548.
- [14] R. Fagin, L. Stockmeyer, *Relaxing the triangle inequality in pattern matching*, Int. J. Comput. Vis., **30**(1998), no. 3, 219-231.
- [15] J. Harjani, K. Sadarangani, *Generalized contractions in partially ordered metric spaces and applications to ordinary differential equations*, Nonlinear Anal., **72**(2010), 1188-1197.
- [16] L. Huang, X. Zhang, *Cone metric spaces and fixed point theorems of contractive mappings*, J. Math. Anal. Appl., **332**(2007), 1468-1476.
- [17] N. Hussian, M.H. Shah, *KKM mappings in cone b-metric spaces*, Comput. Math. Appl., **62**(2011), 1677-1684.
- [18] S. Janković, Z. Golubović, S. Radenović, *Compatible and weakly compatible mappings in cone metric spaces*, Math. Comput. Model., **52**(2010), 1728-1738.
- [19] G. Jungck, *Commuting mappings and common fixed points*, Amer. Math. Monthly, **73**(1966), 735-738.
- [20] G. Jungck, *Compatible mappings and common fixed points*, Int. J. Math. Math. Sci., **9**(1986), 771-779.
- [21] G. Jungck, S. Radenović, S. Radojević, V. Rakocević, *Common fixed point theorems for weakly compatible pairs on cone metric spaces*, Fixed Point Theory Appl., (2009), Article ID 643840.
- [22] W. Kirk, N. Shahzad, *Fixed Point Theory in Distance Spaces*, vol. XI, Springer, 2014, p. 173.
- [23] Z.H. Ma, L.N. Jiang, *C^* -algebra-valued b-metric spaces and related fixed point theorems*, Fixed Point Theory Appl., (2015).
- [24] Z.H. Ma, L.N. Jiang, Q.L. Xin, *Fixed point theorems on operator-valued metric space*, Trans. Beijing Inst. Tech., **34**(10)(2014), 1078-1080.
- [25] Z.H. Ma, L.N. Jiang, H.K. Sun, *C^* -algebra-valued metric spaces and related fixed point theorems*, Fixed Point Theory Appl., **2014**(2014), Art. ID 206.
- [26] R. McConnell, R. Kwok, J. Curlander, W. Kober, S. Pang, *$\Psi - s$ Correlation and dynamic time warping: two methods for tracking ice floes*, IEEE Trans. Geosci. Remote Sens., **29**(1991), no. 6, 1004-1012.
- [27] G.J. Murphy, *C^* -Algebras and Operator Theory*, Academic Press, London, 1990.
- [28] W. Shatanawi, M. Postolache, *Common fixed point theorems for dominating and weak annihilator mappings in ordered metric spaces*, Fixed Point Theory Appl., (2013), Art. ID 271.
- [29] L. Shi, S. Xu, *Common fixed point theorems for two weakly compatible self-mappings in cone b-metric spaces*, Fixed Point Theory Appl., (2013), Art. ID 120.
- [30] E. Tarafdar, *An approach to fixed-point theorems on uniform spaces*, Trans. Amer. Math. Soc., **191**(1974), 209-225.
- [31] Q. Xia, *The geodesic problem in quasimetric spaces*, J. Geom. Anal., **19**(2009), no. 2, 452-479.
- [32] Q.L. Xin, L.N. Jiang, *Common fixed point theorems for generalized k-ordered contractions and B-contractions on noncommutative Banach spaces*, Fixed Point Theory Appl., (2015), Art. ID 77.
- [33] Q.L. Xin, L.N. Jiang, Z.H. Ma, *Common fixed point theorems in C^* -algebra-valued metric spaces*, (in progress).
- [34] Z.H. Yanga, H. Sadatib, S.H. Sedghib, N. Shobec, *Common fixed point theorems for non-compatible self-maps in b-metric spaces*, J. Nonlinear Sci. Appl., **8**(2015), 1022-1031.

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