

SOME FIXED POINT RESULTS IN TVS-CONE METRIC SPACES

T. ABDELJAWAD *** AND SH. REZAPOUR ***

*Department of Mathematics, Çankaya University, 06530, Ankara, Turkey

**Department of Mathematics and Physical Sciences
Prince Sultan University, P. O. Box 66833, Riyadh 11586, Saudi Arabia

***Department of Mathematics, Azarbaijan University of
Tarbiat Moallem, Azarshahr, Tabriz, Iran

Abstract. Every TVS-cone metric space is topologically isomorphic to a topological metric space. In this paper, by using a nonlinear scalarization, we give some fixed point results with nonlinear contractive conditions on TVS-cone metric spaces.

Key Words and Phrases: Cone metric, fixed point, topological vector space.

2010 Mathematics Subject Classification: 47H10, 46T99, 54H25.

REFERENCES

- [1] T. Abdeljawad, *Completion of cone metric spaces*, Hacettepe J. Math. Statistics, **39**(2010), no. 1, 67–74.
- [2] T. Abdeljawad, E. Karapinar, *Quasiconone metric spaces and generalizations of Caristi-Kirk's theorem*, Fixed Point Theory Appl., 2009, Article ID 574387, 9 pages.
- [3] T. Abdeljawad, *Order norm completions of cone metric spaces*, Numerical Functional Anal. Optimization, **32**(2011), no. 5, 477–495.
- [4] T. Abdeljawad, Sh. Rezapour, *On some topological concepts of TVS-cone metric spaces and fixed point theory-Remarks*, arXiv:1102.1419v1.
- [5] T. Abdeljawad, D. Turkoglu, M. Abuloha, *Some theorems and examples of cone Banach spaces*, J. Comput. Anal. and Appl., **12**(2010), no. 4, 739–753.
- [6] T. Abdeljawad, E. Karapinar, *A gap in the paper "A Note on Cone Metric Fixed Point Theory and its Equivalence"*, Gazi Univ. J. Science, **24**(2011), no. 2, 233–234.
- [7] A. Amini-Harandi, M. Fakhar, *Fixed point theory in cone metric spaces obtained via the scalarization method*, Comput. Math. Appl., **59**(2010), 3529–3534.
- [8] A.D. Arandelovic, D.J. Keckic, *On nonlinear quasi-contractions on TVS-cone metric spaces*, Applied Math. Lett., **24**(2011), 1209–1213.
- [9] D.W. Boyd, J.S. Wong, *On nonlinear contractions*, Proc. Amer. Math. Soc., **20**(1969), 458–464.
- [10] G.Y. Chen, X.X. Huang, X.Q. Yang, *Vector Optimization*, Springer-Verlag, 2005.
- [11] B.S. Choudhury, N. Metiya, *Fixed points of weak contractions in cone metric spaces*, Nonlinear Anal., **72**(2010), 1589–1593.
- [12] B.S. Choudhury, *Unique fixed point theorem for weak C-contractive mappings*, Kathmandu University J. Science, Engineering and Technology, **5**(2009), no. 1, 6–13.
- [13] B. Djafari Rouhani, S. Moradi, *Common fixed point of multivalued generalized φ -weak contractive mappings*, Fixed Point Theory Appl., 2010, Article ID 708984, 13 pages.

- [14] Wei-Shih Du, *On some nonlinear problems induced by an abstract maximal element principle*, J. Math. Anal. Appl., **347**(2008), 391-399.
- [15] Wei-Shih Du, *A note on cone metric fixed point theory and its equivalence*, Nonlinear Anal., **72**(2010), 2259-2261.
- [16] R.H. Haghi, Sh. Rezapour, N. Shahzad, *Some fixed point generalizations are not real generalizations*, Nonlinear Anal., **74**(2011), 1799-1803.
- [17] L.G. Huang, X. Zhang, *Cone metric spaces and fixed point theorems of contractive mappings*, J. Math. Anal. Appl., **332**(2007), 1468-1476.
- [18] T.D. Jeffres, *Kahler-Einstein cone metrics*, Ph.D. Thesis, State University of New York at Stony Brook, 1996.
- [19] T.D. Jeffres, *Uniqueness of Kahler-Einstein cone metrics*, Publ. Mat., **44**(2000), no. 2, 437-448.
- [20] T.D. Jeffres, *Schwarz lemma for Kahler cone metrics*, Internat. Math. Res. Notices, (2000), no. 7, 371-382.
- [21] E. Karapinar, *Fixed point theorems in cone Banach spaces*, Fixed Point Theory Appl., (2009) Article ID 609281, 9 pages.
- [22] M.A. Khamsi, *Remarks on cone metric spaces and fixed point theorems of contractive mappings*, Fixed Point Theory Appl., (2010), Article ID 315398, 7 pages.
- [23] M.A. Khamsi, N. Hussain, *KKM mappings in metric type spaces*, Nonlinear Anal., **73**(2010), 3123-3129.
- [24] M.A. Krasnoseljski, P.P. Zabrejko, *Geometrical Methods in Nonlinear Analysis*, Springer-Verlag, Berlin, 1984.
- [25] J.R. Parker, *Variation of cone metrics on Riemann surfaces*, Acta Math., **196**(2006), no. 1, 1-64.
- [26] M. Rabelo, *Harmonic maps into surfaces with two-dimensional cone metrics*, VIII School on Differential Geometry (Campinas, 1992) Mat. Contemp., **4**(1993), 139-151.
- [27] M. Dordevic, D. Doric, Z. Kadelburg, S. Radenovic, D. Spasic, *Fixed points results under c -distance in TVS-cone metric spaces*, Fixed Point Theory Appl., (2011), 2011:29.
- [28] Sh. Rezapour, R. Hambarani Haghi, *Some notes on the paper "Cone metric spaces and fixed point theorems of contractive mappings"*, J. Math. Anal. Appl., **347**(2008), 719-724.
- [29] Sh. Rezapour, H. Khandani, S.M. Vaezpour, *On efficacy of cones on topological vector spaces and application to common fixed points of multifunctions*, Rend. Circ. Mat. Palermo, **59**(2010), 185-197.
- [30] Sh. Rezapour, Z. Saberpour, N. Shahzad, *A metric type sequence property*, submitted.
- [31] D. Turkoglu, M. Abuloha, T. Abdeljawad, *KKM mappings in cone metric spaces and some fixed point theorems*, Nonlinear Anal., **72**(2010), 348-353.
- [32] D. Turkoglu, M. Abuloha, *Cone Metric Spaces and Fixed Point Theorems in Diametrically Contractive Mappings*, Acta Math. Sinica, **26**(2010), no. 3, 489-496.
- [33] G. Schumacher, S. Trapani, *Variation of cone metrics on Riemann surfaces*, J. Math. Anal. Appl., **311**(2005), 218-230.
- [34] A. Somez, *On paracompactness in cone metric spaces*, Applied Math. Letters, **23**(2010), 494-497.
- [35] J.S. Vandergraft, *Newton's method for convex operators in partially ordered spaces*, SIAM J. Numerical Anal., **4**(1967), 406-432.
- [36] P.P. Zabrejko, *K-metric and K-normed linear spaces: survey*, Collect. Math., **48**(1997), 825-859.

Received: October 13, 2011; Accepted: January 12, 2012.