A FIXED POINT THEOREM FOR UNIFORMLY LOCALLY CONTRACTIVE MAPPINGS IN A C-CHAINABLE CONE RECTANGULAR METRIC SPACE

Bessem Samet and Calogero Vetro

Abstract. Recently, Azam, Arshad and Beg [4] introduced the notion of cone rectangular metric spaces by replacing the triangular inequality of a cone metric space by a rectangular inequality. In this paper, we introduce the notion of c-chainable cone rectangular metric space and we establish a fixed point theorem for uniformly locally contractive mappings in such spaces. An example is given to illustrate our obtained result.

Full text

References

[1] M. Abbas and G. Jungck, *Common fixed point results for noncommuting mappings without continuity in cone metric spaces*, J. Math. Anal. Appl. 341 (2008) 416-42. MR2394094(2008m:47071). Zbl 1147.54022.

[2] M. Asadi, S. M. Vaezpour, V. Rakocević and B. E. Rhoades, *Fixed point theorems for contractive mapping in cone metric spaces*, Math. Commun. 16 (2011) 147-155. Zbl 1217.54038.

[3] A. Azam, M. Arshad and I. Beg, *Common fixed points of two maps in cone metric spaces*, Rend. Circ. Mat. Palermo 57 (2008) 433-441. MR2477803(2009k:54070). Zbl 1197.54056.

[4] A. Azam, M. Arshad and I. Beg, *Banach contraction principle on cone rectangular metric spaces*, Appl. Anal. Discrete Math. 3 (2009) 236-241. MR2555036. Zbl 1147.54022.

[5] A. Branciari, *A fixed point theorem of Banach-Caccioppoli type on a class of generalized metric spaces*, Publ. Math. Debrecen. 57 (2000) 31-37. MR190034(2003c:54075). Zbl 0963.54031.

[6] L. Das and L. K. Dey, *A fixed point theorem in a generalized metric space*, Soochow J. Math. 33 (2007) 33-39. MR2294745. Zbl 1137.54024.

[7] W.-S. Du, *A note on cone metric fixed point theory and its equivalence*, Nonlinear Anal. 72 (2010) 2259-2261. MR2577793(2010k:47119). Zbl 1205.54040.

[8] M. Edelstein, *An Extension of Banach's contraction principle*, Proc. Amer. Math. Soc. 12 (1961) 7-10. MR0120625(22 #11375). Zbl 0096.17101.

[9] L. G. Huang and X. Zhang, *Cone metric spaces and fixed point theorems of contractive mappings*, J. Math. Anal. Appl. 332 (2007) 1468-1476. MR2324351(2008d:47111). Zbl 1118.54022.

[10] D. Ilić and V. Rakocević, *Common fixed points for maps on cone metric space*, J. Math. Anal. Appl. 341 (2008) 876-882. MR2398255(2009b:54043). Zbl 1156.54023.

[11] M. Jleli and B. Samet, *The Kannan's fixed point theorem in a cone rectangular metric space*, J. Nonlinear Sci. Appl. 2 (2009) 161-167. MR2521192(2010h:54070). Zbl 1173.54321.

[12] B. V. Kvedaras, A .V. Kibenko and A. I. Perov, *On some boundary value problems*, Litov. Matem. Sbornik. 5 (1) (1965) 69-84. Zbl 0148.33001.

[13] E. M. Mukhamadiev and V. J. Stetsenko, *Fixed point principle in generalized metric space*, Izvestija AN Tadzh. SSR, fiz.-mat. igeol.-chem. nauki. 10 (4) (1969) 8-19 (in Russian).

[14] J. J. Nieto and R. R. Lopez, *Existence and uniqueness of fixed point in partially ordered sets and applications to ordinary differential equations*, Acta Math. Sinica, Engl. Ser. 23 (2007) 2205-2212. MR2357454(2008h:34034). Zbl 1140.47045.

[15] J. O. Olaleru, *Some generalizations of fixed point theorems in cone metric spaces*, Fixed Point Theory Appl. Volume 2009 (2009), Article ID 657914, 10 pages. MR2557261(2010k:54059). Zbl 1203.54043.

[16] A. I. Perov, *The Cauchy problem for systems of ordinary differential equations*, in: Approximate Methods of Solving Differential Equations, Kiev, Naukova Dumka. (1964) 115-134 (in Russian).

[17] A. I. Perov and A. V. Kibenko, *An approach to studying boundary value problems*, Izvestija AN SSSR, Ser. Math. 30 (2) (1966) 249-264 (in Russian). MR0196534(33 #4721).

[18] S. Radenović, V. Rakocević and S. Resapour, *Common fixed points for* (g, f) *type maps in cone metric spaces*, Appl. Math. Comput. 218 (2) (2011) 480-491.

[19] S. Rezapour and R. Hamlbarani, *Some notes on paper: Cone metric spaces and fixed point theorems of contractive mappings*, J. Math. Anal. Appl. 345 (2008) 719-724. MR2429171(2009e:54096). Zbl 1145.54045.

[20] B. Samet, *Discussion on :A fixed point theorem of Banach-Caccioppoli type on a class of generalized metric spaces, by A. Branciari*, Publ. Math. Debrecen. 76 (4) (2010) 493-494. MR2665121. Zbl pre05848614.

[21] B. Samet, *Common fixed point under contractive condition of Ćirić's type in cone metric spaces*, Appl. Anal. Discrete Math. 5 (2011) 159-164. MR2809043.

[22] B. Samet, *Common fixed point theorems involving two pairs of weakly compatible mappings in K-metric spaces*, Appl. Math. Lett. 24 (2011) 1245-1250. MR2784190. Zbl pre05883291.

[23] J. S. Vandergraft, *Newton's method for convex opertaors in partially ordered spaces*, SIAM J. Numer. Anal. 4 (1967) 406-432. MR0221794(36 #4846).

[24] P. Vetro, *Common fixed points in cone metric spaces*, Rend. Circ. Mat. Palermo. 56 (2007) 464-468. MR2376280(2008k:47125).

[25] P. P. Zabrejko, *K-metric and K-normed linear spaces: survey*, Collect. Math. 48 (4-6) (1997) 825-859. MR1602605(99a:46010). Zbl 0892.46002.

B. Samet

Ecole Supérieure des Sciences et Techniques de Tunis, Département de Mathématiques

5, Avenue Taha Hussein-Tunis,

B.P.:56, Bab Menara-1008, Tunisie.

e-mail: bessem.samet@gmail.com

C. Vetro

Dipartimento di Matematica e Informatica, Università degli Studi di Palermo

Via Archirafi 34,

90123 Palermo, Italy.

e-mail: cvetro@math.unipa.it