

*Dedicated to Professor Yeol Je Cho on the occasion of his retirement*

## Fixed point problems concerning contractive type operators on KST-Spaces

ARSLAN H. ANSARI, LILIANA GURAN and ABDUL LATIF

### ABSTRACT.

In this paper, using the concept of  $w$ -distance we prove some results on the existence of fixed points for contractive type operators, namely;  $(\alpha, \mu)$ - $\psi$ -contractive operators. Applications are also presented. Our results improve and generalize a number of known results of fixed point theory including the recent results of Guran and Bota [Guran, L. and Bota, M.-F., *Ulam-Hyers Stability Problems for Fixed Point Theorems concerning  $\alpha$ - $\psi$ -Type Contractive Operators on KST-Spaces*, Submitted in press.] and Ansari [Ansari, A. H. and Shukla, S., *Some fixed point theorems for ordered  $F$ - $(\mathcal{F}, h)$ -contraction and subcontractions in  $\theta$ - $f$ -orbitally complete partial metric spaces*, J. Adv. Math. Stud., **9** (2016), No. 1, 37–53].

**Acknowledgement.** The authors would like to thank the honorable referees for their valuable comments and suggestions.

### REFERENCES

- [1] Ansari, A. H., *Note on  $\alpha$ -admissible mappings and related fixed point theorems*, The 2nd Regional Conference on Mathematics and Applications, Payame Noor University, September 2014, 373–376
- [2] Ansari, A. H. and Shukla, S., *Some fixed point theorems for ordered  $F$ - $(\mathcal{F}, h)$ -contraction and subcontractions in  $\theta$ - $f$ -orbitally complete partial metric spaces*, J. Adv. Math. Stud., **9** (2016), No. 1, 37–53
- [3] Berinde, V., *Contrații generalizate și aplicații*, Editura Club Press 22, Baia Mare, 1997
- [4] Caristi, J., *Fixed point theorems for mappings satisfying inwardness conditions*, Trans. Amer. Math. Soc., **215** (1976), 241–251
- [5] Cho, Y. J., Saadati, R. and Wang, S., *Common fixed point theorems on generalized distance in ordered cone metric spaces*, Computers & Mathematics with Applications, **61** (2011), 1254–1260
- [6] Cho, Y. J. *Survey on Metric Fixed Point Theory and Applications*, Advances in Real and Complex Analysis with Applications, (2017), 183–241
- [7] Choban, M. M., Berinde, V., *A general concept of multiple fixed point for mappings defined on spaces with a distance*, Carpathian J. Math. **33** (2017), no. 3, 275–286
- [8] Choban, M. M., Berinde, V., *Multiple fixed point theorems for contractive and Meir-Keeler type mappings defined on partially ordered spaces with a distance*, Appl. Gen. Topol. **18** (2017), no. 2, 317–330
- [9] Choban, M. M., Berinde, V., *Two open problems in the fixed point theory of contractive type mappings on quasimetric spaces*, Carpathian J. Math. **33** (2017), no. 2, 169–180
- [10] Fukhar-ud-din, H., Berinde, V., *Fixed point iterations for Prešić-Kannan nonexpansive mappings in product convex metric spaces*, Acta Univ. Sapientiae Math. **10** (2018), no. 1, 56–69
- [11] Guran, L., *Ulam-Hyers stability of fixed point equations for singlevalued operators on KST spaces*, Creat. Math. Inform., No. 1, **21** (2012), 41–47
- [12] Guran, L. and Bota, M.-F., *Ulam-Hyers Stability Problems for Fixed Point Theorems concerning  $\alpha$ - $\psi$ -Type Contractive Operators on KST-Spaces*-Submitted in press

Received: 16.08.2017; In revised form: 13.06.2018; Accepted: 15.07.2018

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

Key words and phrases.  $\alpha$ - $\psi$ -weakly contractive operator, Well-posedness, Fixed point, KST-space, Ulam-Hyers  $w$ -stability.

Corresponding author: A. Latif; [alatif@kau.edu.sa](mailto:alatif@kau.edu.sa)

- [13] Hyers, D. H., *On the stability of the linear functional equation*, Proceedings of the National Academy of Sciences of the United States of America, vol.27, No. 4, pp. 222–224, 1941
- [14] Hyers, D. H., Isac, G. and Rassias, Th. M., *Stability of Functional Equations in Several Variables*, Birkhäuser, Basel, Proc. Am. Math. Soc., No. 2, **126** (1998), 425–430
- [15] Kada, O., Suzuki, T. and Takahashi, W., *Nonconvex minimization theorems and fixed point theorems in complete metric spaces*, Math. Japonica, **44** (1996), 381–391
- [16] Karapinar, E., Kumam, P. and Salimi, P., *On  $\alpha$ - $\psi$ -Meir-Keeler contractive mappings*, Fixed Point Theory Appl., 2013, 2013:94
- [17] Latif, A., Isikb, H. and Ansari, A. H., *Fixed points and functional equation problems via cyclic admissible generalized contractive type mappings*, J. Nonlinear Sci. Appl., **9** (2016), 1129–1142
- [18] Lazăr, V. L. , *Ulam-Hyers stability for partial differential inclusions*, Electron. J. Qual. Theory Differ. Equ., **21** (2012), 1–19
- [19] Petru, T. P., Petruşel, A. and J.-C. Yao, *Ulam-Hyers stability for operatorial equations and inclusions via nonself operators*, Taiwanese J. Math., **15** (2011), No. 5, 2195–2212
- [20] Rus, I. A., *Generalized contractions and applications*, Cluj University Press, Cluj-Napoca, 2001
- [21] Rus, I. A., *Remarks on Ulam stability of the operatorial equations*, Fixed Point Theory, **10** (2009), No. 2, 305–320
- [22] Salimi, P., Latif, A., Hussain, N. and Modi, E.,  *$\alpha$ - $\psi$ -contractive mappings with applications*, Fixed Point Theory Appl. (2013), 2013:151
- [23] Samet, B., Vetro, C. and Vetro, P., *Fixed point theorems for  $\alpha$ - $\psi$ -contractive type mappings*, Nonlinear Anal., **75** (2012), 2154–2165
- [24] Shukri, S. A., Berinde, V. and Khan, A. R., *Fixed points of discontinuous mappings in uniformly convex metric spaces*, Fixed Point Theory **19** (2018), No. 1, 397–406
- [25] Suzuki, T. and Takahashi, W., *Fixed points theorems and characterizations of metric completeness*, Topol. Methods Nonlinear Anal., Journal of Juliusz Schauder Center, **8** (1996), 371–382
- [26] Ulam, S. M., *Problems in Modern Mathematics*, John Wiley and Sons, New York, NY, USA, 1964

DEPARTMENT OF MATHEMATICS  
KARAJ BRANCH, ISLAMIC AZAD UNIVERSITY  
KARAJ, IRAN  
E-mail address: analsisamirmath2@gmail.com

DEPARTMENT OF PHARMACEUTICAL SCIENCES, "VASILE GOLDIŞ"  
WESTERN UNIVERSITY OF ARAD  
LIVIU REBREANU STREET 86, 310414 ARAD, ROMANIA  
E-mail address: gliliana.math@gmail.com

DEPARTMENT OF MATHEMATICS  
KING ABDULAZIZ UNIVERSITY  
P. O. BOX 80203, JEDDAH-21589, SAUDI ARABIA  
E-mail address: alatif@kau.edu.sa