Fixed Point Theory, 13(2012), No. 2, 481-494 http://www.math.ubbcluj.ro/~nodeacj/sfptcj.html

J*-HOMOMORPHISMS AND J*-DERIVATIONS ON J*-ALGEBRAS FOR A GENERALIZED JENSEN TYPE FUNCTIONAL EQUATION

M. ESHAGHI GORDJI*, H. KHODAEI*, TH. M. RASSIAS* AND R. KHODABAKHSH**

*Department of Mathematics, Semnan University, P. O. Box 35195-363, Semnan, Iran E-mail: madjid.eshaghi@gmail.com, hkhodaei.math@yahoo.com, trassias@math.ntua.gr

**Department of Mathematics, National Technical University of Athens Zografou, Campus 15780 Athens, Greece E-mail: raziehkhodabakhsh@gmail.com

Abstract. We will apply the fixed point method for proving the stability and superstability of J^* -homomorphisms and J^* -derivations associated to a generalized Jensen type functional equation between J^* -algebras.

Key Words and Phrases: Approximate J^* -homomorphism; approximate J^* -derivation; J^* -algebra; alternative fixed point; generalized Jensen functional equation.

2010 Mathematics Subject Classification: 46L57, 16W25, 39B82, 47B47, 47H10.

Acknowledgement. The authors would like to extend their thanks to referee for his (her) valuable comments and suggestions which helped simplify and improve the results of paper.

References

- T. Aoki, On the stability of the linear transformation in Banach spaces, J. Math. Soc. Japan, (1950), 64–66.
- [2] L. Cadariu, V. Radu, Fixed points and the stability of quadratic functional equations, Analele Universitatii de Vest Timisoara, 41(2003) 25-48.
- [3] L. Cadariu, V. Radu, Fixed points and the stability of Jensen's functional equation, J. Inequal. Pure Appl. Math., 4(2003), Art. ID 4.
- [4] L. Cadariu, V. Radu, On the stability of the Cauchy functional equation: a fixed point approach, Grazer Mathematische Berichte, 346(2004), 43-52.
- [5] L. Cadariu, V. Radu, The fixed point method to stability properties of a functional equation of Jensen type, An. Stiin. Univ. Al. I. Cuza Iaşi, Ser. Noua, Mat., 54(2)(2008), 307–318.
- [6] P. W. Cholewa, Remarks on the stability of functional equations, Aequat. Math., 27(1984), 76-86.
- [7] J.B. Diaz, B. Margolis, A fixed point theorem of the alternative for contractions on a generalized complete metric space, Bull. Amer. Math. Soc., 74(1968), 305-309.
- [8] M. Elin, L. Harris, S. Reich, D. Shoikhet, Evolution equations and geometric function theory in J*-algebras, J. Nonlinear Convex Anal., 3(2002), 81–121.
- M. Eshaghi Gordji, H. Khodaei, Solution and stability of generalized mixed type cubic, quadratic and additive functional equation in quasi-Banach spaces, Nonlinear Anal., 71(2009), 5629–5643.

481

- [10] M. Eshaghi Gordji, M.B. Ghaemi, S. Kaboli Gharetapeh, S. Shams, A. Ebadian, On the stability of J^{*}-derivations, J. Geometry and Physics, 60(3)(2010), 454–459.
- [11] M. Eshaghi Gordji, T. Karimi, S. Kaboli Gharetapeh, Approximately n-Jordan homomorphisms on Banach algebras, J. Ineq. Appl. Volume 2009, Article ID 870843.
- [12] M. Eshaghi Gordji, A. Najati, Approximately J*-homomorphisms: A fixed point approach, J. Geometry and Physics, 60(5)(2010), 809–814.
- [13] M. Eshaghi Gordji, H. Khodaei, J.M. Rassias, Fixed point methods for the stability of general quadratic functional equation, Fixed Point Theory, 12(1)(2011), 71–82.
- [14] Z. Gajda, On stability of additive mappings, Int. J. Math. Math. Sci., 14(1991), 431-434.
- [15] P. Gavruţa, A generalization of the Hyers-Ulam-Rassias stability of approximately additive mappings, J. Math. Anal. Appl., 184(1994), 431-436.
- [16] A. Grabiec, The generalized Hyers-Ulam stability of a class of functional equations, Publ. Math. Debrecen, 48(1996), 217–235.
- [17] L.A. Harris, Bounded symmetric homogeneous domains in infinite-dimensional space, in: Lecture Notes in Mathematics, vol. 364, Springer, Berlin, 1974.
- [18] L.A. Harris, Operator Siegel domains, Proc. Roy. Soc. Edinburgh Sect. A, 79(1977), 137–156.
- [19] D.H. Hyers, On the stability of the linear functional equation, Proc. Natl. Acad. Sci., 27(1941), 222–224.
- [20] S.-M. Jung, Hyers-Ulam-Rassias stability of Jensen's equation and its application, Proc. Amer. Math. Soc., 126(1998), 3137-3143.
- [21] S.-M. Jung, Hyers-Ulam-Rassias Stability of Functional Equations in Mathematical Analysis, Hadronic Press Inc., Palm Harbor, Florida, 2001.
- [22] H. Khodaei, Th. M. Rassias, Approximately generalized additive functions in several variables, Int. J. Nonlinear Anal. Appl., 1(2010), 22–41.
- [23] Y.H. Lee, K.W. Jun, A generalization of the Hyers-Ulam-Rassias stability of Jensens equation, J. Math. Anal. Appl., 238(1999), 305–315.
- [24] A.F. Lopez, H. Marhnine, C. Zarhouti, Derivations on Banach-Jordan pairs, Quart. J. Math., 52(2001), 269-283.
- [25] C. Park, On an approximate automorphism on a C*-algebra, Proc. Amer. Math. Soc., 132(6)(2004), 1739–1745.
- [26] C. Park, Linear *-derivations on JB*-algebras, Acta Math. Sci. Ser. B Engl. Ed., 25(2005), 449–454.
- [27] C. Park, Lie *-homomorphisms between Lie C*-algebras and Lie *-derivations on Lie C*-algebras, J. Math. Anal. Appl., 293(2004), 419–434.
- [28] C. Park, Homomorphisms between Lie JC*-algebras and Cauchy-Rassias stability of Lie JC*-algebra derivations, J. Lie Theory, 15(2005), 393-414.
- [29] C. Park, Homomorphisms between Poisson JC*-algebras, Bull. Braz. Math. Soc., 36(2005), 79–97.
- [30] C. Park, Isomorphisms between C*-ternary algebras, J. Math. Anal. Appl., 327(2007), 101–115.
- [31] C. Park, M. Eshaghi Gordji, Comment on "Approximate ternary Jordan derivations on Banach ternary algebras" [Bavand Savadkouhi et al. J. Math. Phys. 50, 042303 (2009)], J. Math. Phys. 51, 044102 (2010); doi:10.1063/1.3299295 (7 pages).
- [32] C. Park, J.C. Hou, Homomorphisms between C*-algebras associated with the Trif functional equation and linear derivations on C*-algebras, J. Korean Math. Soc., 41(3)(2004), 461-477.
- [33] C. Park, J.C. Hou, S.Q. Oh, Homomorphisms between Lie JC*-algebras Lie C*-algebra, Acta Math. Sinica, 21(2005), 1391–1398.
- [34] C. Park, Th.M. Rassias, Homomorphisms in C*-ternary algebras and JB*-triples, J. Math. Anal. Appl., 337(2008) 13-20.
- [35] C. Park, Th.M. Rassias, Homomorphisms and derivations in proper JCQ*-triples, J. Math. Anal. Appl., 337(2008), 1404-1414.
- [36] V. Radu, The fixed point alternative and the stability of functional equations, Fixed Point Theory, 4(2003) 91-96.
- [37] Th.M. Rassias, New characterization of inner product spaces, Bull. Sci. Math., 108(1984), 95– 99.

- [38] Th.M. Rassias, On the stability of functional equations in Banach spaces, J. Math. Anal. Appl., 251(2000), 264–284.
- [39] Th.M. Rassias, On the stability of functional equations and a problem of Ulam, Acta Appl. Math., 62(2000), 23–130.
- [40] Th.M. Rassias, P. Šemrl, On the Hyers-Ulam stability of linear mappings, J. Math. Anal. Appl., 173(1993), 325–338.
- [41] Th.M. Rassias, On the stability of the linear mapping in Banach spaces, Proc. Amer. Math. Soc., 72(1978), 297–300.
- [42] T. Trif, Hyers-Ulam-Rassias stability of a Jensen type functional equation, J. Math. Anal. Appl., 250(2000), 579–588.
- [43] S.M. Ulam, Problems in Modern Mathematics, Chapter VI, Science Editions, Wiley, New York, 1940.
- [44] H. Upmeier, Jordan Algebras in Analysis, Operator Theory, and Quantum Mechanics, Regional Conf. Ser. in Math., vol. 67, Amer. Math. Soc., Providence, RI, 1987.
- [45] A.R. Villena, Derivations on Jordan-Banach algebras, Studia Math., 118(1996), 205-229.

Received: July 6, 2010; Accepted: October 12, 2011.