Journal of Mathematical Inequalities
Volume 1, Number 3 (2007), 387–407

ON HOMOMORPHISMS BETWEEN C^*–TERNARY ALGEBRAS

ABBAS NAJATI AND ASGHAR RANJBARI

Abstract. C. Park in his paper [C. Park, *Isomorphisms between C^* -ternary algebras*, J. Math. Anal. Appl. 327 (2007) 101–115.], has proved the Hyers-Ulam-Rassias stability of homomorphisms in C^* -ternary algebras and of derivations on C^* -ternary algebras for the following Cauchy-Jensen additive mappings:

$$f\left(\frac{x+y}{2}+z\right)+f\left(\frac{x-y}{2}+z\right)=f(x)+2f(z), \tag{0.1}$$

$$f\left(\frac{x+y}{2}+z\right)-f\left(\frac{x-y}{2}+z\right)=f(y), \tag{0.2}$$

$$2f\left(\frac{x+y}{2}+z\right)=f(x)+f(y)+2f(z). \tag{0.3}$$

These are applied to investigate homomorphisms between C^* -ternary algebras. In this paper we prove the Hyers-Ulam-Rassias stability of homomorphisms in C^* -ternary algebras and of derivations on C^* -ternary algebras for the linear combinations of the Cauchy-Jensen additive mappings (0.1), (0.2) and (0.3).

Mathematics subject classification (2000): 39B52, 17A40, 46B03, 47Jxx.
Key words and phrases: C^* -ternary algebra isomorphism, generalized Cauchy-Jensen functional equation, Hyers-Ulam-Rassias stability, C^* -ternary derivation.

REFERENCES

[1] M. AMYARI AND M. S. MOSLEHIAN, *Approximately ternary semigroup homomorphisms*, Lett. Math. Phys. **77** (2006), 1–9.
[2] C. BAAK, *Cauchy-Rassias stability of Cauchy-Jensen additive mappings in Banach spaces*, Acta Math. Sin. (Engl. Ser.) **22** (2006), no. **6**, 1789–1797.
[3] N. BAZUNOVA, A. BOROWIEC AND R. KERNER, *Universal differential calculus on ternary algebras*, Lett. Math. Phys. **67** (2004), 195–206.
[4] P. CZERWIK, *Functional Equations and Inequalities in Several Variables*, World Scientific Publishing Company, New Jersey, Hong Kong, Singapore and London, 2002.
[5] Z. GAJDA, *On stability of additive mappings*, Internat. J. Math. Math. Sci. **14** (1991), 431–434.
[6] P. GĂVRUTA, *A generalization of the Hyers–Ulam–Rassias stability of approximately additive mappings*, J. Math. Anal. Appl. **184** (1994), 431–436.
[7] D. H. HYERS, *On the stability of the linear functional equation*, Proc. Nat. Acad. Sci. U.S.A. **27** (1941), 222–224.
[8] D. H. HYERS, G. ISAC AND TH. M. RASSIAS, *Stability of Functional Equations in Several Variables*, Birkhä user, Basel, 1998.
[9] D. H. HYERS, G. ISAC AND TH. M. RASSIAS, *On the asymptoticity aspect of Hyers–Ulam stability of mappings*, Proc. Amer. Math. Soc. **126** (1998), 425–430.

[10] G. ISAC AND TH. M. RASSIAS, *Stability of ψ-additive mappings : Applications to nonlinear analysis*, Internat. J. Math. Math. Sci. **19** (1996), 219–228.
[11] S. JUNG, *On the Hyers–Ulam–Rassias stability of approximately additive mappings*, J. Math. Anal. Appl. **204** (1996), 221–226.
[12] C. PARK, *Lie $*$-homomorphisms between Lie C^*-algebras and Lie $*$-derivations on Lie C^*-algebras*, J. Math. Anal. Appl. **293** (2004), 419–434.
[13] C. PARK, *Homomorphisms between Lie JC^*-algebras and Cauchy–Rassias stability of Lie JC^*-algebra derivations*, J. Lie Theory **15** (2005), 393–414.
[14] C. PARK, *Homomorphisms between Poisson JC^*-algebras*, Bull. Braz. Math. Soc. **36** (2005), 79–97.
[15] C. PARK, *Isomorphisms between C^*-ternary algebras*, J. Math. Anal. Appl. **327** (2007) 101-115.
[16] C. PARK, *Hyers–Ulam–Rassias stability of a generalized Euler–Lagrange type additive mapping and isomorphisms between C^*-algebras*, Bull. Belgian Math. Soc. Simon Stevin **13** (2006), 619–631.
[17] C. PARK, *Hyers–Ulam–Rassias stability of a generalized Apollonius–Jensen type additive mapping and isomorphisms between C^*-algebras*, Math. Nachr. (to appear).
[18] A. PRASTARO AND TH. M. RASSIAS, *Ulam stability in geometry of PDE's,* Nonlinear Functional Analysis and Applications, **82** (2003), 259–278.
[19] TH. M. RASSIAS, *On the stability of the linear mapping in Banach spaces*, Proc. Amer. Math. Soc. **72** (1978), 297–300.
[20] TH. M. RASSIAS, *Problem 16; 2*, Report of the 27 $^{\text{th}}$ International Symp. on Functional Equations, Aequationes Math. **39** (1990), 292–293; 309.
[21] TH. M. RASSIAS, *The problem of S. M. Ulam for approximately multiplicative mappings*, J. Math. Anal. Appl. **246** (2000), 352–378.
[22] TH. M. RASSIAS, *On the stability of functional equations in Banach spaces*, J. Math. Anal. Appl. **251** (2000), 264–284.
[23] TH. M. RASSIAS, *On the stability of functional equations and a problem of Ulam*, Acta Appl. Math. **62** (2000), 23–130.
[24] TH. M. RASSIAS, *Functional Equations, Inequalities and Applications*, Kluwer Academic Publishers, Dordrecht, Boston and London, 2003.
[25] TH. M. RASSIAS AND P. ŠEMRL, *On the behaviour of mappings which do not satisfy Hyers–Ulam stability*, Proc. Amer. Math. Soc. **114** (1992), 989–993.
[26] F. SKOF, *Proprietà locali e approssimazione di operatori*, Rend. Sem. Mat. Fis. Milano **53** (1983), 113–129.
[27] S. M. ULAM, *A Collection of the Mathematical Problems*, Interscience Publ. New York, 1960.
[28] H. ZETTL, *A characterization of ternary rings of operators*, Adv. Math. **48** (1983), 117–143.