

ON THE STABILITY OF LEFT δ -CENTRALIZERS ON BANACH LIE TRIPLE SYSTEMS

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Abstract. In this paper under a condition, we prove that every Jordan left δ -centralizer on a Lie triple system is a left δ -centralizer. Moreover, we use a fixed point method to prove the generalized Hyers-Ulam-Rassias stability associated with the Pexiderized Cauchy-Jensen type functional equation

$$rf\left(\frac{x+y}{r}\right) + sg\left(\frac{x-y}{s}\right) = 2h(x),$$

for $r, s \in \mathbb{R} \setminus \{0\}$ in Banach Lie triple systems.

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REFERENCES

- [1] T. AOKI, *On the stability of the linear transformation in Banach spaces*, J. Math. Soc. Japan, **2** (1950), 64–66.
- [2] W. BERTRAM, *The Geometry of Jordan and Lie Structures*, in: Lecture Notes in Math. 1754, Springer-Verlag, 2000.
- [3] A. EBADIAN, N. GHOBADIPOUR AND M. ESHAGHI GORDJI, *A fixed point method for perturbation of bimultipliers and Jordan bimultipliers in C^* -ternary algebras*, J. Math. Phys. **51**, 103508 (2010).
- [4] A. EBADIAN, N. GHOBADIPOUR, TH. M. RASSIAS AND I. NIKOUFAR, *Stability of generalized derivations on Hilbert C^* -modules associated to a pexiderized Cuachy-Jensen type functional equation*, Acta. Math. Scientia, **32** (2012), 1226–1238.
- [5] A. EBADIAN, A. NAJATI AND M. ESHAGHI GORDJI, *On approximate additive–quartic and quadratic–cubic functional equations in two variables on abelia groups*, Results Math. **58** (2010), 39–53.
- [6] M. ESHAGHI GORDJI AND N. GHOBADIPOUR, *Nearly generalized Jordan derivations*, Math. Slovaca, **61**, 1 (2011), 1–8.
- [7] M. ESHAGHI GORDJI, N. GHOBADIPOUR, *Stability of (α, β, γ) –derivations on Lie C^* –algebras*, J. Geom. Phys. **7**, 7 (2010), 1093–1102.
- [8] M. ESHAGHI GORDJI, J. M. RASSIAS AND N. GHOBADIPOUR, *Generalized Hyers–Ulam stability of generalized (n, k) –derivations*, Abst. Appl. Anal. (2009), 1–8.
- [9] P. GÄVRUTA, *A generalization of the Hyers-Ulam-Rassias stability of approximately additive mappings*, J. Math. Anal. Appl. **184** (1994), 431–436.
- [10] Z. GAJDA, *On stability of additive mappings*, Internat. J. Math. Math. Sci. **14** (1991), 431–434.
- [11] D. H. HYERS, *On the stability of the linear functional equation*, Proc. Natl. Acad. Sci. **27** (1941), 222–224.
- [12] D. H. HYERS, G. ISAC, TH. M. RASSIAS, *Stability of functional equations in several variables*, Birkhuser, Boston, 1998.
- [13] N. JACOBSON, *Lie and Jordan triple systems*, Amer. J. Math. **71** (1949), 149–170.
- [14] N. JACOBSON, *General representation theory of Jordan algebras*, Trans. Amer. Math. Soc. **70** (1951), 509–530.
- [15] W. G. LISTER, *A structure theory of Lie triple systems*, Trans. Amer. Math. Soc. **72** (1952), 217–242.

- [16] B. MARGOLIS AND J. B. DIAS, *A fixed point theorem of the alternative for contractions on a generalized complete metric space*, Bull. Amer. Math. Soc. **74** (1968), 305–309.
- [17] M. S. MOSLEHIAN AND T. M. RASSIAS, *Generalized Hyers–Ulam stability of mappings on normed Lie triple systems*, Math. Inequal. Appl. **11**, (2) (2008), 371–380.
- [18] A. NAJATI, *Cauchy-Rassias stability of homomorphisms associated to a Pexiderized Cauchy-Jensen type functional equation*, J. Math. Inequalities, **3**, 2 (2009), 257–265.
- [19] C. PARK, *Homomorphisms between Poisson JC^* -algebras*, Bull. Braz. Math. Soc. **36** (2005), 79–97.
- [20] J. M. RASSIAS, *Solution of the Ulam stability problem for quartic mappings*, Glasnik Matematički, **34** (1999), 243–252.
- [21] J. M. RASSIAS, *On a new approximation of approximately linear mappings by linear mappings*, Discussiones Mathematicae, **7** (1985), 193–196.
- [22] J. M. RASSIAS, *On approximation of approximately linear mappings by linear mappings*, Journal of Functional Analysis, **46**, (1982), 126–130.
- [23] TH. M. RASSIAS, *On the stability of the linear mapping in Banach spaces*, Proc. Amer. Math. Soc. **72** (1978), 297–300.
- [24] TH. M. RASSIAS, P. ŠEMRL, *On the behavior of mappings which do not satisfy Hyers-Ulam stability*, Proc. Amer. Math. Soc. **114** (1992), 989–993.
- [25] TH. M. RASSIAS, *Problem 16; 2, Report of the 27th International Symp. on Functional Equations*, Aequationes Math. **39** (1990), 292–293.
- [26] TH. M. RASSIAS (Ed.), *Functional Equations, Inequalities and Applications*, Kluwer Academic, Dordrecht, 2003.
- [27] S. M. ULAM, *A Collection of the Mathematical Problems*, Interscience Publ., New York, 1940.