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ESTIMATION OF INEXACT RECIPROCAL-QUINTIC AND RECIPROCAL-SEXTIC FUNCTIONAL EQUATIONS

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Abstract. The purpose of this study is to investigate Ulam stability of reciprocal-quintic and reciprocal-sextic functional equations in non-Archimedean fields pertinent to the results ascertained by Hyers, Rassias, and Găvruta. Illustrative examples are provided to show that the results are not valid for the singular cases.

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Key words. Hyers-Ulam stability, non-Archimedean field, reciprocal functional equation, reciprocal-quintic functional equation, reciprocal-sextic functional equation.

REFERENCES

- AOKI, T., On the stability of the linear transformation in Banach spaces, J. Math. Soc. Japan, 2 (1950), 64–66.
- BODAGHI, A., Approximate mixed type additive and quartic functional equation, Bol. Soc. Parana. Mat., 35 (2017), 43–56.
- [3] BODAGHI, A., Intuitionistic fuzzy stability of the generalized forms of cubic and quartic functional equations, Journal of Intelligent & Fuzzy Systems, 30 (2016), 2309–2317.
- [4] BODAGHI, A. and KIM, S.O., Approximation on the quadratic reciprocal functional equation, J. Funct. Spaces, 2014 (2014), Article ID 532463, 1–5.
- [5] BODAGHI, A. and EBRAHIMDOOST, Y., On the stability of quadratic reciprocal functional equation in non-Archimedean fields, Asian-Eur. J. Math., 9 (2016), 1650002, 1–9.
- [6] BODAGHI, A., NARASIMMAN, P., RASSIAS, J.M. and RAVI, K., Ulam stability of the reciprocal functional equation in non-Archimedean fields, Acta Math. Univ. Comenian., 85 (2016), 113–124.
- BOURGIN, D.G., Classes of transformations and bordering transformations, Bull. Amer. Math. Soc., 57 (1951), 223–237.
- [8] CHANG, I.S., and KIM, H.M., On the Hyers-Ulam stability of quadratic functional equations, JIPAM. J. Inequal. Pure Appl. Math., 3 (2002), 1–12.
- [9] GAJDA, Z., On the stability of additive maps, Int. J. Math. Math. Sci., 14 (1991), 431–434.
- [10] GĂVRUTA, P., A Generalization of the Hyers-Ulam-Rassias stability of approximately additive maps, J. Math. Anal. Appl., 184 (1994), 431–436.
- [11] GRUBER, P.M., Stability of isometries, Trans. Amer. Math. Soc., 245 (1978), 263–277.
- [12] HYERS, D.H., On the stability of the linear functional equation, Proc. Natl. Acad. Sci. USA, 27 (1941), 222–224.
- [13] KIM, C.I. and SHIN, C.H., The Hyers-Ulam stability of a quadratic functional equation with involution in paranormed spaces, Korean J. Math., 24 (2016), 41–49.
- [14] KIM, S.O. and BODAGHI, A., Hyperstability of Jordan triple derivations on Banach algebras, Acta Math. Vietnam., 41 (2016), 583–594.

- [15] KIM, S.O., SENTHIL KUMAR, B.V. and BODAGHI, A., Approximation on the reciprocalcubic and reciprocal-quartic functional equations in non-Archimedean fields, Adv. Difference Equ., 2017 (2017), Article 77, 1–12.
- [16] NARASIMMAN, P., RASSIAS, J.M. and RAVI, K., n-dimensional quintic and sextic functional equations and their stabilities in Felbin type spaces, Georgian Math. J., 23 (2016), 121–137.
- [17] RASSIAS, J.M., On approximation of approximately linear maps by linear maps, J. Funct. Anal., 46 (1982), 126–130.
- [18] RAVI, K., RASSIAS, J.M., ARUNKUMAR, M. and KODANDAN, R., Stability of a generalized mixed type additive, quadratic, cubic and quartic functional equation, JIPAM. J. Inequal. Pure Appl. Math., 10 (2009), 1–29.
- [19] RAVI, K. and SENTHIL KUMAR, B.V., Ulam-Gavruta-Rassias stability of Rassias reciprocal functional equation, Global J. of Appl. Math. and Math. Sci., 3 (2010), 57–79.
- [20] RAVI, K., RASSIAS, J.M. and SENTHIL KUMAR, B.V., Ulam stability of generalized reciprocal functional equation in several variables, Int. J. App. Math. Stat., 19 (2010), 1–19.
- [21] RAVI, K. and SENTHIL KUMAR, B.V., Stability and geometrical interpretation of reciprocal functional equation, Asian Journal of Current Engineering and Maths, 1 (2012), 300–304.
- [22] RAVI, K., RASSIAS, J.M. and SENTHIL KUMAR, B.V., Ulam stability of a generalized reciprocal type functional equation in non-Archimedean fields, Arab. J. Math., 4 (2015), 117–126.
- [23] RASSIAS, T.M., On the stability of the linear map in Banach spaces, Proc. Amer. Math. Soc., 72 (1978), 297–300.
- [24] SENTHIL KUMAR, B.V., RAVI, K. and RASSIAS, J.M., Solution and generalized Ulam-Hyers stability of a reciprocal type functional equation in non-Archimedean fields, World Scientific News, **31** (2016), 71–81.
- [25] ULAM, S.M., Problems in Modern Mathematics, Chapter VI, Wiley-Interscience, New York, 1964.
- [26] XU, T.Z., RASSIAS, M.J., XU, W.X. and RASSIAS, J.M., A fixed point approach to the intuitionistic fuzzy stability of quintic and sextic functional equations, Iran. J. Fuzzy Syst., 9 (2012), 21–40.
- [27] YANG, S.Y., BODAGHI, A. and MOHD ATAN, K.A., Approximate cubic *-derivations on Banach *-algebras, Abstr. Appl. Anal., 2012 (2012), Article ID 684179, 1–12.

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