

## REMARKS ON THE STABILITY OF THE 3-VARIABLE FUNCTIONAL INEQUALITIES OF DRYGAS

JEDSADA SENASUKH AND SATIT SAEJUNG\*

**Abstract.** We give some remarks on the recent paper [*J. Math. Inequal.* **13** (4) (2019), 1235–1244]. Some misleading conclusions of their stability results are carefully discussed and corrected. Moreover, we reestablish their results with a more general assumption and a stronger conclusion.

*Mathematics subject classification (2020):* 39B05, 39B62, 39B82.

*Keywords and phrases:* Functional inequality, 3-variable Drygas functional equation, additive functional equation, stability.

### REFERENCES

- [1] T. AOKI, *On the stability of the linear transformation in Banach spaces*, J. Math. Soc. Japan, **2**, (1950), 157–159.
- [2] H. DRYGAS, *Quasi-inner products and their applications*, 13–30, Theory Decis. Lib Ser. B: Math. Statist. Methods, Reidel, Dordrecht, 1987.
- [3] B. R. EBANKS, PL. KANNAPPAN, P. K. SAHOO, *A common generalization of functional equations characterizing normed and quasi-inner-product spaces*, Canad. Math. Bull., **35**, 3 (1992), 321–327.
- [4] V. A. FAŽIEV, P. K. SAHOO, *On the stability of Drygas functional equation on groups*, Banach J. Math. Anal., **1**, 1 (2007), 43–55.
- [5] W. FECHNER, *Stability of a functional inequality associated with the Jordan-von Neumann functional equation*, Aequationes Math., **71**, 1–2 (2006), 149–161.
- [6] G. L. FORTI, *Comments on the core of the direct method for proving Hyers-Ulam stability of functional equations*, J. Math. Anal. Appl., **295**, (2004), 127–133.
- [7] Z. GAJDA, *On stability of additive mappings*, Internat. J. Math. Math. Sci., **14**, 3 (1991), 431–434.
- [8] P. GĂVRUTA, *A generalization of the Hyers-Ulam-Rassias stability of approximately additive mappings*, J. Math. Anal. Appl., **184**, (1994), 431–436.
- [9] A. GILÁNYI, *On a problem by K. Nikodem*, Math. Inequal. Appl., **5**, 4 (2002), 707–710.
- [10] D. H. HYERS, *On the stability of the linear functional equation*, Proc. Nat. Acad. Sci. U.S.A., **27**, (1941), 222–224.
- [11] S. M. JUNG, K. P. SAHOO, *Stability of a functional equation of Drygas*, Aequationes Math., **64**, 3 (2002), 263–273.
- [12] B. KHOSRAVI, M. MOGHIMI, A. NAJATI, *Asymptotic aspect of Drygas, quadratic and Jensen functional equations in metric abelian groups*, Acta Math. Hungar., **155**, 2 (2018), 248–265.
- [13] G. H. KIM, *Addendum to ‘On the stability of functional equations on square-symmetric groupoid’*, Nonlinear Anal., **62**, (2005), 365–381.
- [14] I. C. KIM AND G. J. GIL, *Stability of Drygas type functional equations with involution in non-Archimedean Banach spaces by fixed point method*, J. Appl. Math. Inform., **34**, 5–6 (2016), 509–517.
- [15] G. LU, Q. LIU, Y. JIN, J. XIE, *3-variable Jensen  $\rho$ -functional inequalities and equations*, J. Nonlinear Sci. Appl., **9**, 12 (2016), 5995–6003.
- [16] C. PARK, *Additive  $\rho$ -functional inequalities and equations*, J. Math. Inequal., **9**, 1 (2015), 17–26.
- [17] C. PARK, *Additive  $\rho$ -functional inequalities in non-Archimedean normed spaces*, J. Math. Inequal., **9**, 2 (2015), 397–407.

- [18] C. PARK, Y. CHO, M. HAN, *Functional inequalities associated with Jordan-von Neumann-type additive functional equations*, J. Inequal. Appl., (2007), Art. ID 41820.
- [19] C. PARK, Y. JIN, X. ZHANG, *Bi-additive  $s$ -functional inequalities and quasi-multipliers on Banach algebras*, Rocky Mountain J. Math., **49**, 2 (2019), 593–607.
- [20] TH. M. RASSIAS, *On the stability of the linear mapping in Banach spaces*, Proc. Am. Math. Soc., **72**, (1978), 297–300.
- [21] W. SUN, Y. JIN, C. PARK, G. LU, *3-variable double  $\rho$ -functional inequalities of Drygas*, J. Math. Inequal., **13**, 4 (2019), 1235–1244.
- [22] S. M. ULAM, *Problems in Modern Mathematics*, Chapter VI, Science ed., Wiley, New York, 1940.