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Delta-exponential mappings in Banach algebras. (English) Zbl 0905.46030

Bandle, C. (ed.) et al., General inequalities 7. 7th international conference, Oberwolfach, Germany, November 13–18, 1995. Proceedings. Basel: Birkhäuser. ISNM, Int. Ser. Numer. Math. 123, 285-296 (1997).

Summary: An intriguing interplay between the theory of delta-convex mappings (in the sense of Veselý and Zajiček) and the Hyers-Ulam stability problems is developed by studying a functional inequality

$$\|F(x+y)-F(x)F(y)\| \leq f(x)f(y)-f(x+y). \tag{$*$}$$

This is an "exponential version" of the inequality

$$\|F(x+y)-F(x)-F(y)\| \leq \|x\|+\|y\|-\|x+y\|,$$

proposed first by D. Yost and then generalized to

$$\|F(x+y)-F(x)-F(y)\| \leq f(x)+f(y)-f(x+y).$$

A superstability phenomenon in connection with $(*)$ is examined.

For the entire collection see [Zbl 0864.00057].

MSC:

46G05 Derivatives of functions in infinite-dimensional spaces
39B52 Functional equations for functions with more general domains and/or ranges

Keywords:

delta-convex mappings; Hyers-Ulam stability; superstability