**Badora, Roman**
**On approximate ring homomorphisms.** (English) | Zbl 1014.39020 |
J. Math. Anal. Appl. 276, No. 2, 589-597 (2002).

The subject is stability of Hyers-Ulam type and of Rassias type of ring homomorphisms from a ring $\mathcal{R}$ into a Banach-algebra $\mathcal{B}$.

The main result of the paper on Hyers-Ulam stability is: Let $f : \mathcal{R} \to \mathcal{B}$ and let $\varepsilon, \delta > 0$. If $\|f(x + y) - f(x) - f(y)\| \leq \varepsilon$ and $\|f(xy) - f(x)f(y)\| \leq \delta$ for all $x, y \in \mathcal{R}$, then there is exactly one ring homomorphism $h : \mathcal{R} \to \mathcal{B}$ such that $\|f(x) - h(x)\| \leq \varepsilon$ for all $x \in \mathcal{R}$. This extends Theorem 5 of *D. G. Bourgin*'s paper [Duke Math. J. 16, 385–397 (1949; Zbl 0033.37702)].

The author modifies his proof to obtain a similar result about stability of Rassias type of ring homomorphisms in case $\mathcal{R}$ is a normed algebra.

Reviewer: Henrik Stetkaer (Aarhus)

**MSC:**

| | |
|---|---|
| 39B82 | Stability, separation, extension, and related topics for functional equations |
| 39B52 | Functional equations for functions with more general domains and/or ranges |

Cited in **4** Reviews
Cited in **36** Documents

**Keywords:**

Hyers-Ulam stability; Rassias stability; Banach-algebra; ring homomorphisms

**Full Text:** DOI

**References:**

[1] Aczél, J., Lectures on functional equations and their application, (1966), Academic Press New York

[2] Bourgin, D.G., Approximately isometric and multiplicative transformations on continuous function rings, Duke math. J., 16, 385-397, (1949) · Zbl 0033.37702

[3] Gajda, Z., On stability of additive mappings, Internat. J. math. math. sci., 14, 431-434, (1991) · Zbl 0739.39013

[4] Hyers, D.H., On the stability of the linear functional equation, Proc. nat. acad. sci. U.S.A., 27, 222-224, (1941) · Zbl 0061.26403

[5] Hyers, D.H.; Isac, G.; Rassias, Th.M., Stability of functional equations in several variables, (1998), Birkhäuser Boston · Zbl 0894.39012

[6] Johnson, B.E., Approximately multiplicative maps between Banach algebras, J. London math. soc. (2), 37, 294-316, (1988) · Zbl 0652.46031

[7] Rassias, Th.M., On the stability of the linear mapping in Banach spaces, Proc. amer. math. soc., 72, 297-300, (1978) · Zbl 0398.47040

[8] Ulam, S.M., A collection of mathematical problems, (1960), Interscience New York · Zbl 0086.24101