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On the Ulam type stability of several types of quadratic fuzzy set-valued functional equations. (English) [Zbl 1310.39021](#)

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Summary: Let Y be a real separable Banach space and $(\mathcal{F}_{KC}(Y), d_\infty)$ be the space of all normal fuzzy convex and upper semicontinuous fuzzy sets with compact support in Y , where d_∞ stands for the supremum metric in $\mathcal{F}_{KC}(Y)$. In the present paper, several types of quadratic fuzzy set-valued functional equations are introduced based on the space mentioned above. We prove the Hyers-Ulam stability of the standard quadratic fuzzy set-valued functional equation by using the fixed point technique. Simultaneously, we also establish some Ulam type stability results of the Deeba and Appolonius type fuzzy set-valued functional equations by employing the direct method, respectively. The stability results of the corresponding single-valued and set-valued functional equations acting as special cases will be included in our results.

MSC:

- 39B82 Stability, separation, extension, and related topics for functional equations
- 39B52 Functional equations for functions with more general domains and/or ranges
- 46S40 Fuzzy functional analysis

Keywords:

Ulam-type stability; Hausdorff separation; supremum metric; quadratic fuzzy set-valued functional equation; Banach space; Hyers-Ulam stability; direct method

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