Journal of Algebra and Applied Mathematics
Vol. 23 (2025), No.2, pp.117-133
ISSN: 2319-7234

URL : www.sasip.net

Dimensional extension of Zadeh's max-min composition operator on generalized quadratic fuzzy sets: from 2D to 3D with structural consistency

Y.S. Yun and B. Lee*

Abstract. we show that the parametric operations for two generalized quadratic fuzzy sets defined on $\mathbb{R}^3$ is a generalization of a Zadeh's max-min composition operations for two generalized quadratic fuzzy sets defined on $\mathbb{R}^2$. We formally define 3D quadratic fuzzy numbers and their multidimensional membership representation. This work lays a theoretical foundation for the development of high-dimensional fuzzy systems, particularly in applications where reasoning occurs over multi-input spatial domains.

AMS Subject Classification (2000): 47S40, 03E72

Keywords: max-min composition operator, generalized 3-dimensional quadratic fuzzy sets

*Corresponding author