



Aalto-yliopisto
Perustieteiden
korkeakoulu

Accuracy of approximate operations on fuzzy numbers

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1.12.2015

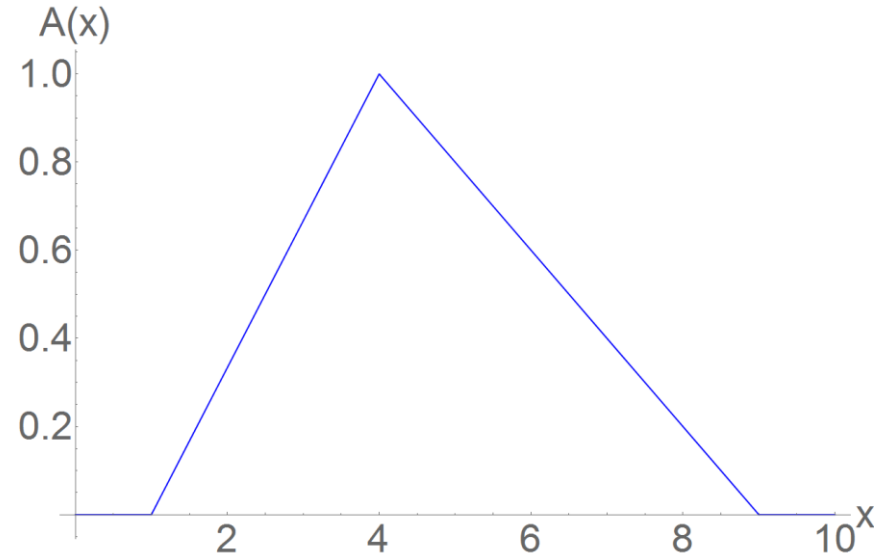
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Valvoja: Prof. *Raimo P. Hämmäläinen*

Työn saa tallentaa ja julkistaa Aalto-yliopiston avoimilla verkkosivuilla. Muilta osin kaikki oikeudet pidätetään.

Fuzzy number

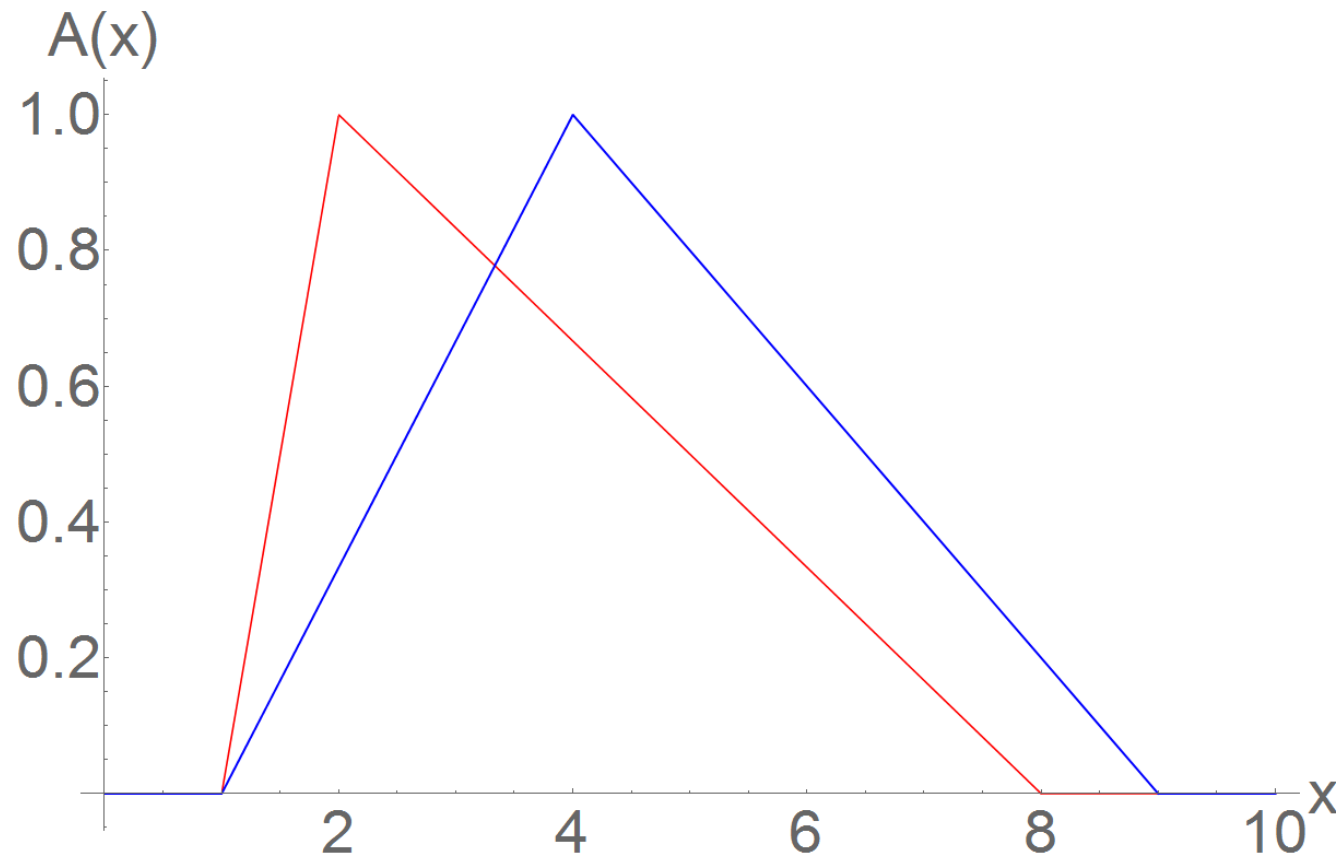
- A fuzzy set of type A: $\mathbb{R} \rightarrow [0,1]$



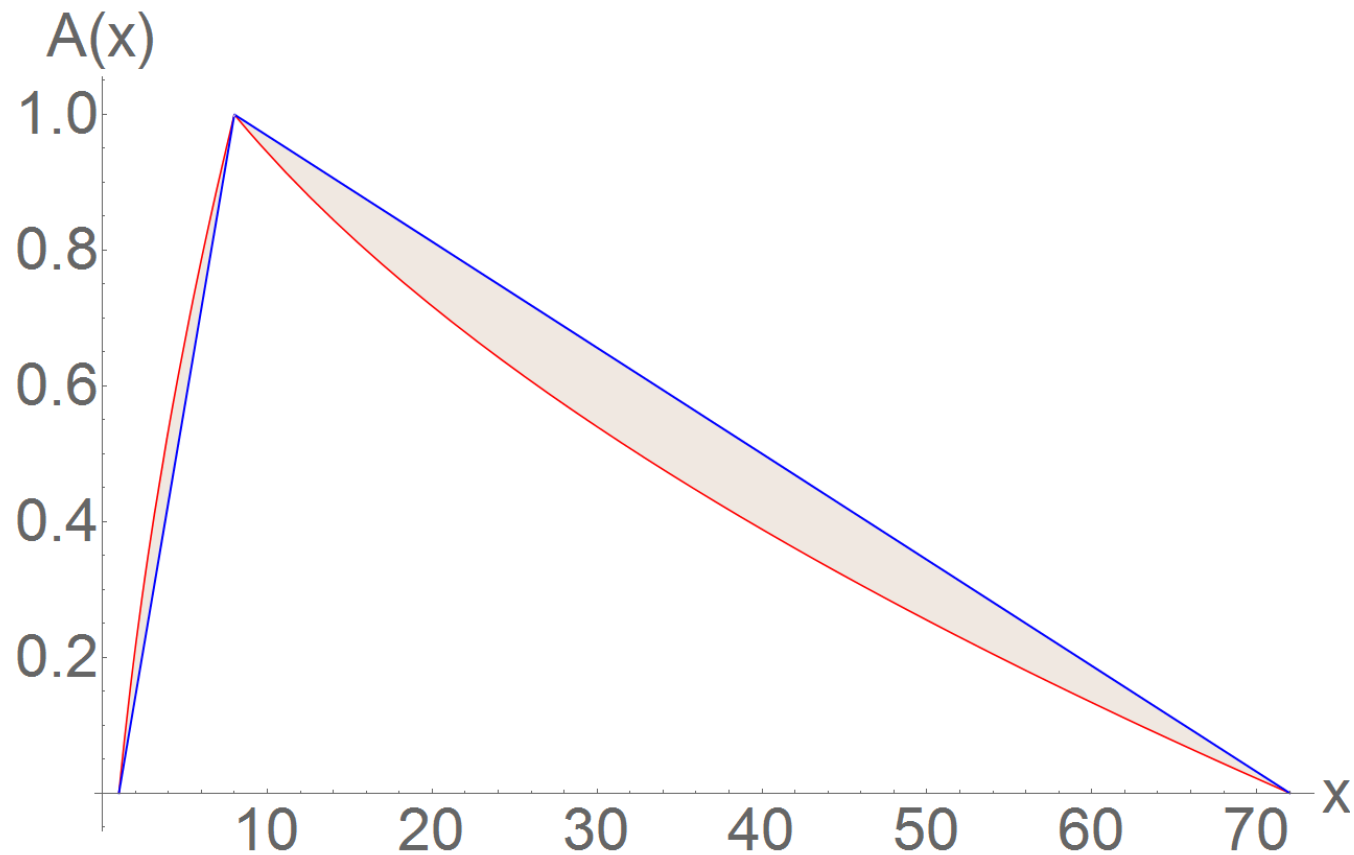
Background

- Non-linear operations on fuzzy numbers are assumed to be linear in majority of literature and research
 - Multiplication and division
- This assumption may cause errors in ranking fuzzy numbers obtained from such operations
- Fairly little research exists on this problem

Product of two triangular fuzzy numbers



Product of two triangular fuzzy numbers



Objectives

- Determining the significance of error caused by the linear approximation on multiplication on fuzzy numbers.
- Further analyzing scenarios where error is significant.

Literature

- Klir, G. and Yuan, B. *Fuzzy Sets and Fuzzy Logic*, volume 4. Prentice Hall New Jersey, 1995.
- Giachetti R. and Young R. *Analysis of the error in the standard approximation used for multiplication of triangular and trapezoidal fuzzy numbers and the development of a new application*. *Fuzzy Sets and Systems*, 91, 1997, pp. 1-13.

Schedule

- Preliminary Work -10/2015
- Introduction of Topic 1.12.2015
- Writing the Thesis 11-12/2015
- Presentation of Thesis 18.1.2016