

## Proposal of Project 1

**Project title:** On “A new criterion of choice between generalized triangular fuzzy numbers”.

**Adviser:** Zhenyuan Wang.

**Status:** Available.

**Project’s starting and ending dates:** From October 2016 to the end of June 2017.

**Abstract:** Research paper “A new criterion of choice between generalized triangular fuzzy numbers” written by an Italian Professor, Franco Molinari, recently was published at top level international journal *Fuzzy Sets and Systems*. It involves some grave and essential mistakes. They concern some fundamental knowledge on relations, such as ranking and total ordering, defined on an infinite set, as well as on real analysis. This project requires giving a clear description and definition for several common relations on nonempty sets. Then, a counterexample based on an alternate series should be constructed to show that a major conclusion in Molinari’s paper is incorrect.

**Purpose:** Through this project, the student will learn basic set theory and fuzzy set theory, and use analysis with numerical computational methods to complete a short research paper that can be submitted to an international journal.

### References:

- [1] G. J. Klir and B. Yuan, *Fuzzy Sets and Fuzzy Logic: Theory and Applications*, Prentice Hall, 1995.
- [2] F. Molinari, A new criterion of choice between generalized triangular fuzzy numbers, *Fuzz Sets and Systems* 296 (2016), 51-69.
- [3] F. Molinari, A new criterion of choice between generalized trapezoidal fuzzy numbers, submitted to *Fuzz Sets and Systems*.
- [4] W. Wang and Z. Wang, Total orderings defined on the set of all fuzzy numbers, *Fuzzy sets and Systems* 234 (2014), 31-41.
- [5] Z. Wang, R. Yang, and K. S. Leung, *Nonlinear integrals and Their Applications in Data Mining*, World Scientific, 2010.

- [6] Z. Wang and L. Zhang-Westman, New ranking method for fuzzy numbers by their expansion center, *The Journal of Artificial Intelligence and Soft Computing Research* 4(3) (2014), 181-188.
- [7] L. A. Zadeh, Fuzzy sets as a basis for a theory of possibility, *Fuzz Sets and Systems* 1 (1978), 3-28.

**Timetable:**

**October-December, 2016.** Preparing the basic knowledge on fuzzy sets, fuzzy numbers, and relations.

**January-February, 2017.** Reading Molinari's paper and find its mistakes.

**March-April, 2017.** Constructing a counterexample and calculating the necessary numerical data.

**May-June, 2017.** Writing a research paper and complete the project.