# Interactive computing*

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The topic of this contribution belongs to the basic ground of fuzzy set theory. We plan to discuss the notion of interactivity. Although the notion of interactivity is quite old (it has been defined by L. Zadeh in 1975), many mathematicians do not consider it when applying some results of fuzzy set theory. This fact is somewhat surprising because the well-known Zadeh's (extension) extension is a special case of the interactivity-based (sup-J) extension principle.

The notion of interactivity between two or more fuzzy numbers is strongly connected with notions of a joint possibility extension J and a so-called sup-J extension principle, and it has been intensively studied in the last two decades. For instance, in 2004, Fullér, Carlsson, and Majlender ([1]) introduced a relation between interactivity and a joint possibility distribution, practical aspects of (both non-interactive and) interactive computing (the one given by a sup-J extension principle) were studied by K. Scheerlinck, B. de Baets, et al. ([2]) about ten years ago, and numerous mathematicians studied also interactive fuzzy arithmetic in the last decade. Surprisingly, the interactive arithmetics can provide some interesting features, that are not available for "standard" fuzzy arithmetic (i.e. the one using Zadeh's extension principle), and the group around E. Esmi, de Barros et al. recently showed useful practical impacts of the interactive computing. For instance, one can mention the existence of the inverse element for the interactive addition, the existence of the interactive derivative, etc.

In our talk, we would like to go further in this direction by studying some aspects of interactive arithmetics: for instance, by studying conditions, under which the interactive operation preserves inverse elements of given operations, defining new types of joint possibility distributions and relations to some known ones.

## References

1. C. Carlsson, R. Fullér, P. Majlender, *Additions of completely correlated fuzzy numbers*, IEEE International Conference on Fuzzy Systems, vol. 1 (2004), 535–539.

* Supported from the project "Research of Excellence on Digital Technologies and Wellbeing CZ.02.01.01/00/22_008/0004583", which is co-financed by the European Union.

2. K. Scheerlinck, H. Vernieuwe, N.E.C. Verhoest and B. De Baets, Practical computing with interactive fuzzy variables, (2014) APPLIED SOFT COMPUTING. 22, 518-527.