

**Horčík, Rostislav**

**Solution of a system of linear equations with fuzzy numbers.** (English) Zbl 1183.65048

*Fuzzy Sets Syst.* 159, No. 14, 1788-1810 (2008).

This paper deals with system of linear equations whose parameters are fuzzy. It is inspired by results of interval arithmetic and tries to extend some of these to a fuzzy setting. The results are proved in monoidal T-norm based logic and the solutions to fuzzy linear equations are determined by the truth degree of membership formulas for the solution of the linear system in fuzzy logic. The paper includes computed examples and topics for further research.

Reviewer: [Frank Uhlig \(Auburn\)](#)

**MSC:**

[65G40](#) General methods in interval analysis  
[15A06](#) Linear equations (linear algebraic aspects)  
[65F05](#) Direct numerical methods for linear systems and matrix inversion  
[15B15](#) Fuzzy matrices  
[08A72](#) Fuzzy algebraic structures

Cited in **10** Documents

**Keywords:**

[linear system](#); [fuzzy numbers](#); [fuzzy arithmetic](#); [fuzzy interval](#); [interval analysis](#); [united solution set](#); [numerical examples](#); [fuzzy linear equations](#)

**Full Text:** [DOI](#)

**References:**

- [1] Běhounek, L.; Cintula, P., Fuzzy class theory, *Fuzzy sets and systems*, 154, 1, 34-55, (2005) · [Zbl 1086.03043](#)
- [2] Běhounek, L.; Cintula, P., From fuzzy logic to fuzzy mathematics: a methodological manifesto, *Fuzzy sets and systems*, 157, 5, 642-646, (2006) · [Zbl 1108.03027](#)
- [3] L. Běhounek, P. Cintula, Fuzzy class theory: a primer v1.0, Technical Report V-939, Institute of Computer Science, Academy of Sciences of the Czech Republic, Prague, 2006, Available at [http://www.cs.cas.cz/research/library/reports\\_900.shtml](http://www.cs.cas.cz/research/library/reports_900.shtml).
- [4] Biacino, L.; Lettieri, A., Equations with fuzzy numbers, *Inform. sci.*, 47, 63-76, (1989) · [Zbl 0664.04006](#)
- [5] Buckley, J.J.; Qu, Y., Solving linear and quadratic fuzzy equations, *Fuzzy sets and systems*, 38, 43-59, (1990) · [Zbl 0713.04004](#)
- [6] Buckley, J.J.; Qu, Y., Solving fuzzy equations: a new solution concept, *Fuzzy sets and systems*, 39, 291-301, (1991) · [Zbl 0723.04005](#)
- [7] Buckley, J.J.; Qu, Y., Solving systems of linear fuzzy equations, *Fuzzy sets and systems*, 43, 33-43, (1991) · [Zbl 0741.65023](#)
- [8] Dubois, D.; Prade, H., Fuzzy-set-theoretic differences and inclusions and their use in the analysis of fuzzy equations, *Control cybernet.*, 13, 129-146, (1984) · [Zbl 0549.03020](#)
- [9] Esteva, F.; Godo, L., Monoidal t-norm based logic: towards a logic for left-continuous t-norms, *Fuzzy sets and systems*, 124, 271-288, (2001) · [Zbl 0994.03017](#)
- [10] P. Hájek, *Metamathematics of fuzzy logic*, Trends in Logic—Studia Logica Library, Vol. 4, Kluwer Academic Publishers, Dordrecht, 1998.
- [11] Inuiguchi, M.; Ramík, J.; Tanino, T.; Vlach, M., Satisfying solutions and duality in interval and fuzzy linear programming, *Fuzzy sets and systems*, 135, 151-177, (2003) · [Zbl 1026.90105](#)
- [12] Inuiguchia, M.; Ramík, J.; Tanino, T., Oblique fuzzy vectors and their use in possibilistic linear programming, *Fuzzy sets and systems*, 135, 123-150, (2003) · [Zbl 1026.90104](#)
- [13] Lodwick, W.A.; Jamison, K.D., Special issue: interfaces between fuzzy set theory and interval analysis, *Fuzzy sets and systems*, 135, 1-3, (2003)
- [14] Mesiar, R., Triangular-norm-based addition of fuzzy intervals, *Fuzzy sets and systems*, 91, 231-237, (1997) · [Zbl 0919.04011](#)
- [15] Moore, R.; Lodwick, W., Interval analysis and fuzzy set theory, *Fuzzy sets and systems*, 135, 5-9, (2003) · [Zbl 1015.03513](#)
- [16] Moore, R.E., *Methods and applications of interval analysis*, (1979), SIAM Philadelphia · [Zbl 0417.65022](#)
- [17] Neumaier, A., *Interval methods for systems of equations*, (1990), Cambridge University Press Cambridge · [Zbl 0706.15009](#)
- [18] Oettli, W., On the solution set of a linear system with inaccurate coefficients, *SIAM J. numer. anal.*, 2, 115-118, (1965) · [Zbl 0146.13404](#)

- [19] Sanchez, E., Solution of fuzzy equations with extended operations, Fuzzy sets and systems, 12, 237-248, (1984) · [Zbl 0556.04001](#)
- [20] Shary, S.P., A new technique in systems analysis under interval uncertainty and ambiguity, Reliable comput., 8, 321-418, (2002) · [Zbl 1020.65029](#)
- [21] Wasowski, J., On solution of fuzzy equations, Control cybernet., 26, 653-658, (1997) · [Zbl 0936.03053](#)
- [22] Zhao, R.; Govind, R., Solutions of algebraic equations involving generalized fuzzy numbers, Inform. sci., 56, 199-243, (1991) · [Zbl 0726.65048](#)

This reference list is based on information provided by the publisher or from digital mathematics libraries. Its items are heuristically matched to zbMATH identifiers and may contain data conversion errors. It attempts to reflect the references listed in the original paper as accurately as possible without claiming the completeness or perfect precision of the matching.