Boroujeni, Marziyeh; Basiri, Abdolali; Rahmany, Sajjad; Valibouze, Annick
Finding solutions of fuzzy polynomial equations systems by an algebraic method. (English)
Zbl 1373.65038

The paper deals with systems of polynomial equations, where polynomial coefficients can be fuzzy numbers of the form \( A = \{a(r), \bar{a}(r) \} : r \in [0, 1] \) with increasing \( a \) and decreasing \( \bar{a} \). Since the addition of fuzzy numbers is not invertible (e.g. for intervals we have \([1, 3] + [-3, -1] = [-2, 2] \neq 0\)), then the right hand side cannot be the zero vector, but should be a vector of fuzzy numbers. In the case of triangular fuzzy number coefficients (with linear boundary functions \( a, \bar{a} \)), such a system of \( m \) equations can be transformed into a real polynomial system of \( 2m \) equations. This polynomial system can be solved by Wu's algorithm, which relies on partial elimination of variables in order to obtain an equivalent family of triangle systems [W. Wu and X. Gao, “Automated reasoning and equation solving with the characteristic set method”, J. Comput. Sci. Technol. 21, 756–764 (2006); M. Jin et al., J. Symb. Comput. 50, 431–449 (2013; Zbl 1255.13001)]. The paper contains also six examples of fuzzy polynomial equation systems solved by using the Epsilon package in Maple [Epsilon 0.6.18. http://www-calfor.lip6.fr/wang/epsilon].

Reviewer: Józef Drewniak (Rzeszów)

MSC:
65H10 Numerical computation of solutions to systems of equations
13P15 Solving polynomial systems; resultants
26E50 Fuzzy real analysis
65H04 Numerical computation of roots of polynomial equations

Keywords:
polynomial system; fuzzy polynomial system; triangular fuzzy number; characteristic sets; Wu’s algorithm

Software:
Maple; Epsilon; ISOLATE

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References:

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