A Direct Numerical Algorithm for Solving Systems of Nonlinear Equations Using Multidimensional Logarithmic Residue Formulas

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The methods for numerical solving systems of nonlinear equations make use of initial points which are arbitrarily close to unknown solutions of these systems. However, in most cases, it is too difficult to pre-locate solutions, so a suitable choice for initial points becomes a hard problem. The first aim of this paper is to describe and study an efficient algorithm for approximating solutions of algebraic systems. The algorithm uses multidimensional logarithmic residue integral formulas. Our second aim is to interpret this algorithm as a fast and reliable new method for locating initial points of well known numerical methods. For this purpose, we combine our algorithm with well known iterative schemes and investigate convergence rate and complexity properties of the resulting combined methods. The proposed method is tested through various sets of equations. Useful results are summarized in tables.

References

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