

The exponentially convergent scalar homotopy algorithm for solving the nonlinear optimization problems

Chung-Lun Kuo, Chein-Shan Liu, Jiang-Ren Chang

Summary

In this study, the exponentially convergent scalar homotopy algorithm (ECSHA) is proposed to solve the nonlinear optimization problems under equality and inequality constraints. The Kuhn-Tucker optimality conditions associated with NCP-functions are adopted to transform the nonlinear optimization problems into a set of nonlinear algebraic equations. Then the ECSHA is used to solve the resultant nonlinear equations. The proposed scheme keeps the merit of the conventional homotopy method, such as global convergence, but the inverse of the Jacobian matrix is avoid with the aid of the scalar homotopy function. Several numerical examples are provided to demonstrate the efficiency of the proposed algorithm. The proposed scheme performs exponentially convergence behavior and achieves a very accurate result of the minimum of the goal function.

