The performance of the IMSS2-5D procedure for simultaneous bounding of polynomial zeros

ABSTRACT

A new modified interval midpoint symmetric single-step IMSS2-5D procedure which is an extension from the previous ISS2 procedure is formulated in this paper. This procedure is in need of some pre-conditions for the initial interval to converge to the zeros respectively, starting with some disjoint intervals, each of which contains a polynomial zero. The procedure IMSS2-5D will produce a set of intervals of smallest possible width such that each interval includes one or more zeros of the polynomial from a given initial interval. The efficiency of the procedure is measured based on the CPU times, number of iterations and the value of the intervals width after satisfying the convergence criterion. The six test polynomials are used in order to verify the procedure. The numerical results are obtained by using MATLAB. The results indicated that the IMSS2-5D procedure outperformed the existing ISS2 and ISS2-5D procedures. Therefore, this study suggests that it would be practical to use IMSS2-5D procedure for simultaneously bounding the polynomial zeros.

Keyword: IMSS2-5D procedure; Polynomial zero