

On the convergence rate of interval repeated midpoint zero symmetric single-step procedure for simultaneous bounding the polynomial zeros

ABSTRACT

In this paper, we present the analysis of the rate of convergence of the interval repeated midpoint zero symmetric single-step procedure (IRMZSS) which is the extension of the interval midpoint zero symmetric single-step procedure (IMZSS). The results show that the procedure IRMZSS has R-order of convergence at least $7r + 1$ ($r \times 1$) or $0R(\text{IRMZSS}) \times 7r + 1$ ($r \times 1$), whereas the procedure IMZSS R-order of convergence at least 8 or $0R(\text{IMZSS}) \times 8$. In fact $0R(\text{IRMZSS}) \times 0R(\text{IMZSS})$ and $0R(\text{IRMZSS}) = 0R(\text{IRMZSS}) = 0R(\text{IMZSS})$ when $r = 1$.

Keyword: Interval analysis; Inclusion; Convergence; R-order of convergence; Simultaneous bounding; Polynomial; Real zeros