

On Constructing a Cubically Convergent Numerical Method for Multiple Roots

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Abstract : We propose the numerical method defined by $x_{n+1} = x_n - \lambda[f(x_n - \mu h(x_n))/f'(x_n)]$, $n \in \mathbb{N}$, and determine the control parameter λ and μ to converge cubically. In addition, we derive the asymptotic error constant. Applying this proposed scheme to various test functions, numerical results show a good agreement with the theory analyzed in this paper and are proven using Mathematica with its high-precision computability.

Keywords : asymptotic error constant, iterative method, multiple root, root-finding

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