

Optimal Steffensen-type method for approximating multiple roots

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In this work we focus in the problem of approximating multiple roots for nonlinear problems. We present a new family of iterative methods for approximating a multiple root of a nonlinear equation when the multiplicity is known. The methods are optimal in Kung- Traub's sense, because only three functional values per iteration are computed. By adding just one more function evaluation we make this family derivative free preserving the converge order. To check the theoretical results, we codify all new algorithms and apply it to diferent numerical examples.