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New second-order and third-order iterative methods based on the homotopy perturbation theory are presented for solving nonlinear equations. These methods do not need to compute the derivatives. The second-order iterative method has the same asymptotic error constant and convergence rate compared with the Newton-method. The third-order iterative method has a faster rate of convergence and high precision compared with the Newton method and the new second-order iterative methods.

Reviewer: Rózsa Horváth-Bokor (Budapest)

MSC:
65H05 Numerical computation of solutions to single equations
65H20 Global methods, including homotopy approaches to the numerical solution of nonlinear equations

Keywords:
nonlinear equation; iterative method; homotopy perturbation method; Newton method; third-order iterative methods; asymptotic error constant; convergence

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References:

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