An efficient approach for solving nonlinear troesch's and bratu's problems by wavelet analysis method

ABSTRACT

We introduce Chebyshev wavelet analysis method to solve the nonlinear Troesch and Bratu problems. Chebyshev wavelets expansions together with operational matrix of derivative are employed to reduce the computation of nonlinear problems to a system of algebraic equations. Several examples are given to validate the efficiency and accuracy of the proposed technique. We compare the results with those ones reported in the literature in order to demonstrate that the method converges rapidly and approximates the exact solution very accurately by using only a small number of Chebyshev wavelet basis functions. Convergence analysis is also included.