Abstract

In this paper, a finite element method involving Petrov-Galerkin method with quintic B-splines as basis functions and sextic B-splines as weight functions has been developed to solve a general tenth order boundary value problem with a particular case of boundary conditions. The basis functions are redefined into a new set of basis functions which vanish on the boundary where the Dirichlet, the Neumann, the second order derivative and the third order derivative type of boundary conditions are prescribed. The weight functions are also redefined into a new set of weight functions which in number match with the number of redefined basis functions. The proposed method was applied to solve several examples of tenth order linear and nonlinear boundary value problems. The obtained numerical results were found to be in good agreement with the exact solutions available in the literature.

References


Index Terms

Computer Science

Applied Sciences
Keywords

Basis functions, Tenth order boundary value problem, Quintic B-splines, Sextic B-splines, Petrov-Galerkin method, Weight functions.