Abstract

In this paper, we present a finite element method involving Galerkin method with quintic B-splines as basis functions to solve a general eighth order two point boundary value problem. The basis functions are redefined into a new set of basis functions which vanish on the boundary where Dirichlet type of boundary conditions, Neumann boundary conditions, second order derivative boundary conditions and third order derivative type of boundary conditions are prescribed. The proposed method was applied to solve several examples of the eighth order linear and nonlinear boundary value problems. The solution of a nonlinear boundary value problem has been obtained as the limit of a sequence of solution of linear boundary value problems generated by quasilinearization technique. The obtained numerical results are compared with exact solutions available in the literature.

References

- Shen, Y. I. Hybrid damping through intelligent constrained layer layer treatments.
Numerical Solution of Eighth Order Boundary Value Problems by Galerkin Method with Quintic B-splines

- Carl, de-Boor. 2001 A Pratical guide to splines. Springer-Verlag.

**Index Terms**

Computer Science

Applied Mathematics

**Keywords**

Galerkin method; Quintic B-spline; Basis function; Eighth order boundary value problem; Absolute error.