Numerical Solution of Fourth Order Boundary Value Problems by Petrov-Galerkin Method with Cubic B-splines as basis Functions and Quintic B-Splines as Weight Functions

Abstract

This paper deals with a finite element method involving Petrov-Galerkin method with cubic B-splines as basis functions and quintic B-splines as weight functions to solve a general fourth 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 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 fourth 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

Numerical Solution of Fourth Order Boundary Value Problems by Petrov-Galerkin Method with Cubic B-splines as basis Functions and Quintic B-Splines as Weight Functions


- K. N. S. Kasi Viswanadham and Y. Showri Raju, Cubic B-spline collocation method for

Index Terms

Computer Science Applied Mathematics

Keywords
Petrov-Galerkin method Cubic B-spline Quintic B-spline Fourth order boundary value problem Absolute error.