

NUMERICAL SOLUTION OF SIXTH ORDER BOUNDARY VALUE PROBLEMS BY PETROV-GALERKIN METHOD WITH QUINTIC B-SPLINES AS BASIS FUNCTIONS AND SEPTIC B-SPLINES AS WEIGHT FUNCTIONS

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ABSTRACT

In this paper a finite element method involving Petrov-Galerkin method with quintic B-splines as basis functions and septic B-splines as weight functions has been developed to solve a general sixth 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 and the Neumann 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 sixth 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.

KEYWORDS: Absolute Error, Petrov – Galerkin Method, Quintic B-Spline, Septic B-Spline, Sixth Order Boundary Value Problem