

NUMERICAL SOLUTION OF SIXTH ORDER BOUNDARY VALUE PROBLEMS BY GALERKIN METHOD WITH QUINTIC B-SPLINES

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Abstract

A finite element method involving Galerkin method with quintic B-splines as basis functions has been developed to solve the sixth order boundary value problems. The basis functions are redefined into a new set of basis functions which vanish on the boundary where Dirichlet boundary conditions, Neumann boundary conditions and second order derivative types of boundary conditions are prescribed. The proposed method was applied to solve several examples of sixth order linear and nonlinear boundary value problems. The solution of a non-linear 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.

Key Words : *Galerkin method, Quintic B-spline, Basis function, Sixth order boundary value problem, Absolute error.*

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