Abstract

A finite element method involving Galerkin method with quartic B-splines as basis functions has been developed to solve a general fifth order 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 and Neumann boundary conditions are prescribed. The proposed method was applied to solve several examples of fifth 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 the exact solutions available in the literature.


Numerical Solution of Fifth Order Boundary Value Problems by Galerkin Method with Quartic B-splines

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Index Terms
Computer Science
Applied Mathematics

Keywords
Galerkin method; Quartic B-spline; Basis function; Fifth order boundary value problem; Absolute error.