

## NUMERICAL SOLUTION OF TENTH ORDER BOUNDARY VALUE PROBLEMS BY GALERKIN METHOD WITH SEXTIC B-SPLINES

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### ABSTRACT

A finite element method involving Galerkin method with sextic B-splines as basis functions has been developed to solve a general tenth order boundary value problem. The basis functions are redefined into a new set of basis functions which vanish on the boundary where the Dirichlet, Neumann, second order derivative, third order derivative and fourth order derivative types of boundary conditions are prescribed. The proposed method was applied to solve several examples of tenth 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 the exact solutions available in the literature.

**KEYWORDS:** Absolute Error, Basis Function, Galerkin Method, Sextic B-Spline, Tenth Order Boundary Value Problem