

**NUMERICAL SOLUTION OF FIFTH ORDER BVP BY GALERKIN
METHOD WITH CUBIC B-SPLINES**

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Abstract: We developed a numerical method to solve a general fifth order two point bvp using Galerkin method with cubic B-splines. The basis functions are modified into a new set of basis functions which vanish on the all most all boundary conditions. To test the efficiency of the proposed method, we applied this scheme on several fifth order linear and nonlinear bvp's. The solution of a non-linear boundary value problem has been obtained by quasilinearization technique. We found numerical results were closed to the exact solutions available in the literature.

Keywords and Phrases: Galerkin method, Cubic B-spline, Fifth order bvp, Error.

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1. Introduction and Preliminaries

We consider a general fifth order linear bvp

$$a_0(x)y^{(5)}(x)+a_1(x)y^{(4)}(x)+a_2(x)y'''(x)+a_3(x)y''(x)+a_4(x)y'(x)+a_5(x)y(x) = b(x), \\ c < x < d \quad (1)$$

subject to boundary conditions

$$y(c) = A_0, \quad y(d) = C_0, \quad y'(c) = A_1, \quad y'(d) = C_1, \quad y''(c) = A_2 \quad (2)$$