

## Collocation Method for Coupled System of Boundary Value Problems with Cubic B-Splines

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**Abstract :** Coupled system of second order linear and nonlinear boundary value problems occur in various fields of Science and Engineering. In the formulation of the problem, any one of 81 possible types of boundary conditions may occur. These 81 possible boundary conditions are written as a combination of four boundary conditions. To solve a coupled system of boundary value problem with these converted boundary conditions, a collocation method with cubic B-splines as basis functions has been developed. In the collocation method, the mesh points of the space variable domain have been selected as the collocation points. The basis functions have been redefined into a new set of basis functions which in number match with the number of mesh points in the space variable domain. The solution of a non-linear boundary value problem has been obtained as the limit of a sequence of solutions of linear boundary value problems generated by quasilinearization technique. Several linear and nonlinear boundary value problems are presented to test the efficiency of the proposed method and found that numerical results obtained by the present method are in good agreement with the exact solutions available in the literature.

**Keywords :** collocation method, coupled system, cubic b-splines, mesh points

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