Exact Operational Matrices for Rational Bernstein Polynomials and its Application for Solving MHD Problem

Fardin Salehi[1], FATEMEH BAHARIFARD[2], Sayyed Ali Hossayni[1], and Kourosh Parand[1]

[1]Shahid Beheshti University
[2]Institute for Research in Fundamental Sciences

August 16, 2022

Abstract

In this paper, Rational Bernstein polynomials on the semi-infinite interval are adapted to solve a Magnetohydrodynamic (MHD) problem. Also, the derivative, product, convert, and Galerkin Exact Operational Matrices (EOMs) of these polynomials are produced. Using the spectral Galerkin method and the Exact Operational Matrices (EOMs) of Rational Bernstein polynomials, we solve the problem with high accuracy and speed. The problem is the flow of MHD micropolar over a moving plate with suction and injection boundary conditions. Comparing the results of the Rational Bernstein Galerkin method with operational matrices and without operational matrices shows that the present method is faster than another method. Also, comparing the results of the Rational Bernstein Galerkin method and Rational Gegenbauer Tau method shows that the present method is more accurate than another method.

Hosted file

Exact Operational Matrices for Rational Bernstein Polynomials and its Application for Solving MHD Proble
available at https://authorea.com/users/501615/articles/581980-exact-operational-matrices-for-rational-bernstein-polynomials-and-its-application-for-solving-mhd-problem

1