Numerical Solution for Benjamin-Bona-Mahony-Burgers Equation Using Septic B-Spline Galerkin Method

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Abstract: In this research, a numerical solution to the Benjamin-Bona-Mahony-Burger (BBMB) equation utilizing septic B-spline Galerkin method has been proposed. The accuracy of the method has been tested by evaluating L_2 and L_∞ error norms. Furthermore, the obtained numerical results are compared with those available in the literature. Finally, some graphical representations have been presented to show the method efficiency.

Keywords: *partial differential equations (PDEs); Benjamin-Bona-Mahony-Burger (BBMB) equation; B-spline Galerkin method.*

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1 Introduction

Many phenomena in applied sciences such as engineering, physics, and chemistry can be described through mathematical models. Partial differential equations (PDEs) can be considered one of the most important of these models [1], [2]. The Benjamin-Bona-Mahoney-Berger (BBMB) equation is one of the fundamental types of nonlinear dispersive equations that has occurred in various areas of applied mathematics [3], [4]. The BBMB equation is a mathematical model proposed in [5] to study the unidirectional long wave motion with small amplitudes. The BBMB equation represents the mathematical

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