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Construction of Block Numerical Methods for Solving Second-Order Ordinary Differential Equations

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Abstract

In this work, a new block method with characteristics of linear multi-step formulas (LMFs) is developed for solving second-order initial value problems of ordinary differential equations [1]. The derivation of the Linear Multi-step Formulas (LMF) used in the method is achieved via the method of undetermined coefficients [2]. The discrete schemes and their derivatives are derived by applying a shift operator to two linear multi-step formulas [2, 3]. The fundamental properties of the proposed scheme are analyzed. The Numerical experimentation and comparative analysis with existing methods show that our scheme is efficient [4, 5].

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