



A Novel Method for Solving Caputo-Time-Fractional Dispersive Long Wave Wu-Zhang System

A. Jaradat¹, M.S.M. Noorani¹, M. Alquran^{2*} and H.M. Jaradat³

¹ School of Mathematical Sciences, University of Kebangsaan Malaysia, Bangi, Malaysia

² Department of Mathematics and Statistics, Jordan University of Science and Technology, P.O. Box (3030), Irbid (22110), Jordan

³ Department of Mathematics, Al Al-Bayt University, Mafrq, Jordan

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Abstract: In this paper we presented a reliable efficient numerical scheme to find analytical supportive solution of Caputo-time-fractional Wu-Zhang system. A modified version of generalized Taylor power series method is used in this work. Graphical justifications of the reliability of the proposed method are provided. Finally, the effects of the fractional order on the solution of Wu-Zhang system is also discussed.

Keywords: Caputo-time-fractional Wu-Zhang system; approximate solutions; generalized Taylor series.

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1 Introduction

Wu-Zhang system is known also as (1+1)-dimensional dispersive long wave equations [25]. It is very helpful for coastal and civil engineers to apply the nonlinear water wave model in harbor and coastal design. Abundant soliton solutions are obtained to this model using the extended hyperbolic tangent expansion method. In [20], the Wu-Zhang system is considered to study dispersive long waves. The extended trial equation method is used and solitary wave solutions are obtained. Also, they used the mapping method to extract more solitonic solutions.

Finding analytical solution to fractional nonlinear differential equations is a difficult task. In the literature, different computational schemes were developed for either finding numerical solutions over a specific range or considering a few terms of an iterative computational series solution as an approximate. Such available methods are the variational

* Corresponding author: <mailto:marwan04@just.edu.jo>