



A computational Method for Solving a System of Volterra Integro-differential Equations

H. Jafari^{1*} and A. Azad²

¹ *Department of Mathematics, University of Mazandaran, Babolsar, Iran.*

² *Young Research Club, Islamic Azad University-Ayatollah Amoli Branch, Amol, Iran*

Received: December 6, 2011; Revised: October 8, 2012

Abstract: In this paper we present a reliable algorithm for solving a system of Volterra integro-differential equations using Taylor series expansion method and computer algebra. This method converts a system of Volterra integro-differential equations to a system of linear algebraic equations. Some illustrative examples have been presented to illustrate the implementation of the algorithm and efficiency of the method.

Keywords: *system of Volterra integro-differential equations; Taylor-series expansion method; ordinary differential equations; system of linear algebraic equations.*

Mathematics Subject Classification (2010): 45J05, 34K28.

1 Introduction

A number of problems in chemistry, physics and engineering are modeled in terms of system of Volterra integro-differential equations. Various methods have been developed to prove existence and uniqueness of solutions to integro-differential equations [3].

In this paper, we use a modified Taylor-series expansion method for solving system of Volterra integro-differential equations. This method was first presented by Kanwal and Liu et. al. [1] for solving integral equations and in [2, 6] for solving Fredholm integral equations of second kind. Daftardar-Gejji et. al. have used this method for solving system of ordinary differential equations [4]. Maleknejad et. al. have applied this method for solving Volterra integral equations and system of Volterra integral equations

* Corresponding author: <mailto:jafari@umz.ac.ir>