Computational Techniques for Differential Equations (Mathematics Studies)

COMPUTATIONAL METHODS IN APPLIED MATHEMATICS, Vol. 2 (2002), No. 2, pp. 113–124

NUMERICAL SOLUTIONS OF FUZZY DIFFERENTIAL EQUATIONS BY TAYLOR METHOD

SAEID ABBASBANDY

Department of Mathematics, Imam Khomeini International University
Qazvin, Iran
E-mail: abbasbandy@yahoo.com

TOFIGH ALLAH VIRANLOO

Department of Mathematics, Islamic Azad University
Tehran, Iran
E-mail: alahviranlo@yahoo.com

Abstract — In this paper, numerical algorithms for solving “fuzzy ordinary differential equations” are considered. A scheme based on the Taylor method of order p is discussed in detail and this is followed by a complete error analysis. The algorithm is illustrated by solving some linear and nonlinear fuzzy Cauchy problems.

2000 Mathematics Subject Classification: 34A12; 65L05.

Keywords: fuzzy differential equation, p-order Taylor method, fuzzy Cauchy problem.

1. Introduction

Knowledge about dynamical systems modeled by differential equations is often incomplete or vague. It concerns, for example, parameter values, functional relationships, or initial conditions. The well-known methods for solving analytically or numerically initial value problems can only be used for finding a selected system behavior, e.g., by fixing the unknown parameters to some plausible values. However, in this case, it is not possible to describe the whole set of system behaviors compatible with our partial knowledge. We may set that the fuzzy input is somehow transformed into the fuzzy output defined by the corresponding crisp systems. This reasons us to refer such systems to as Fuzzy Input – Fuzzy Output (FIFO) systems. Here, we are going to “operationalize” our approach, i.e., to propose a method for computing the approximate solution for a fuzzy differential equation using numerical methods. Since finding this set of solutions analytically does only work with trivial examples, a numerical approach seems to be the only way to “solve” such problems.

The topics of fuzzy differential equations, which attracted a growing interest for some time, in particular, in relation to the fuzzy control, have been rapidly developed recent years. The concept of a fuzzy derivative was first introduced by S. L. Chang, L. A. Zadeh in [4]. It was followed up by D. Dubois, H. Prade in [5], who defined and used the extension principle.

Buy Computational Techniques for Differential Equations (Mathematics Studies) on evolutivmedias.com ? FREE SHIPPING on qualified orders.Computational Techniques for Differential Equations - 1st Edition - ISBN: , View all volumes in this series: North-Holland Mathematics Studies.Keywords: multilevel adaptive technique (MLAT), partial differential equations, virtual global grid technique, fast adaptive composite grid method (FAC).Computational Methods for Differential Equations (CMDE) Numerical studies of non-local hyperbolic partial differential equations using collocation methods.The Numerical Solution of Ordinary Differential Equations: Initial Value Problems. Original research article: Pages Robert May, John Noye. Download PDF.Computational Techniques for Solving Differential Equations by Cubic, In the present paper we describe a survey on recent spline techniques for solving boundary value problems in International Journal of Computer Mathematics Communication Studies Computer Science Development Studies.Offered every fall and spring term. Brief description: Mathematical models based on Ordinary Differential Equations (ODEs) are ubiquitous these days, arising in.Numerical and computational mathematics; Partial differential equations . Computational Methods in Applied Mathematics is covered by the following services.Journal of Applied & Computational Mathematics is an academic journal provides an Methods for Partial Differential Equations, BIT Numerical Mathematics, In mathematics a boundary value problem is a differential equation together with Fuzzy differential value is a popular topic studied by many researchers and it is.Methods for Differential Equations COMPUTATIONAL TECHNIQUES. Computational Techniques for Differential Equations (Mathematics Studies) [B.J. Noye].DN Computational Methods for Stochastic Differential Equations credits The student learns the basic mathematical theory for stochastic differential equations and optimal control and applies it to some real-world Add-on studies .Abstract: Multistep methods for initial value problems are expressed in a matrix form. The application of such methods to higher-order equations is studied with.Studies in Applied Mathematics On a Differential Equation of Boundary Layer Type approximation of a parabolic singularly perturbed differential equation, Applied Mathematics and Computation, , Recently Developed Computational Methods for Solving Singularly Perturbed Partial Differential Equations Arising.Welcomed are papers describing new computational techniques for solving . of ordinary differential equations (ODEs) is a key issue of computation science, quasi-consistency goes back to , when Kulikov studied it in the first time but .Buy the Computational Techniques For Differential Equations (ebook) online from Takealot. Many ways to pay. Free Delivery Available. Non-Returnable.Computational mathematics is the branch of applied mathematics that develops and In Numerical Methods for Partial Differential Equations Doctoral studies .Computational mathematics may refer to two different aspect of the relation between computing of differential and integral calculus(newton's method) and financial maths to Computational Mathematics: Models, Methods, and Analysis with MATLAB.

Approximation theory Numerical analysis Differential equations.

[PDF] The Promise. R.L. Scott-Buccleuch (MacMillan Readers)

[PDF] Prehistoric times as illustrated by ancient remains and the manners and customs of modern savages

[PDF] A Framework for Marketing Management

[PDF] The Spanish Subjunctive: The Only Guide You will EVER need

[PDF] Assistive Technologies: Principles and Practice

[PDF] La Carta Robada (Spanish Edition)

[PDF] True Vampires: Blood-Sucking Killers Past and Present