

Application of Homotopy Analysis Method for Solving Ordinary and Partial Differential Equations



Dr. V. P. Gohil & Dr. G.A. Ranabhatt

Maple Code For Homotopy Analysis Method

Brendan G. Carr



Maple Code For Homotopy Analysis Method:

Applications of Semi-Analytical Methods for Nanofluid Flow and Heat Transfer Mohsen Sheikholeslami, Davood Domairry Ganji, 2018-01-02 Application of Semi Analytical Methods for Nanofluid Flow and Heat Transfer applies semi analytical methods to solve a range of engineering problems After various methods are introduced their application in nanofluid flow and heat transfer magnetohydrodynamic flow electrohydrodynamic flow and heat transfer and nanofluid flow in porous media within several examples are explored This is a valuable reference resource for materials scientists and engineers that will help familiarize them with a wide range of semi analytical methods and how they are used in nanofluid flow and heat transfer The book also includes case studies to illustrate how these methods are used in practice Presents detailed information giving readers a complete familiarity with governing equations where nanofluid is used as working fluid Provides the fundamentals of new analytical methods applying them to applications of nanofluid flow and heat transfer in the presence of magnetic and electric field Gives a detailed overview of nanofluid motion in porous media **External Magnetic Field**

Effects on Hydrothermal Treatment of Nanofluid Mohsen Sheikholeslami, Davood Domairry Ganji, 2016-03-08 This book seeks to comprehensively cover recent progress in computational fluid dynamics and nonlinear science and its applications to MHD and FHD nanofluid flow and heat transfer The book will be a valuable reference source to researchers in various fields including materials science nanotechnology mathematics physics information science engineering and medicine seeing to understand the impact of external magnetic fields on the hydrothermal behavior of nanofluids in order to solve a wide variety of theoretical and practical problems Readers will gain a full understanding of the fundamentals in new numerical and analytical methods in MHD Magnetohydrodynamics Includes complete coverage of governing equations in which nanofluid is used as working fluid and where magnetic fields are applied to nanofluids A single source reference covering recent progress in computational fluid dynamics and nonlinear science and its applications to MHD and FHD nanofluid flow and heat transfer

Proceedings of the Second International Conference on Soft Computing for Problem Solving (SocProS 2012), December 28-30, 2012 B. V. Babu, Atulya Nagar, Kusum Deep, Millie Pant, Jagdish Chand Bansal, Kanad Ray, Umesh Gupta, 2014-07-08 The present book is based on the research papers presented in the International Conference on Soft Computing for Problem Solving SocProS 2012 held at JK Lakshmipat University Jaipur India This book provides the latest developments in the area of soft computing and covers a variety of topics including mathematical modeling image processing optimization swarm intelligence evolutionary algorithms fuzzy logic neural networks forecasting data mining etc The objective of the book is to familiarize the reader with the latest scientific developments that are taking place in various fields and the latest sophisticated problem solving tools that are being developed to deal with the complex and intricate problems that are otherwise difficult to solve by the usual and traditional methods The book is directed to the researchers and scientists engaged in various fields of Science and Technology **Energy Conversion and Green Energy Storage** Amit

Soni, Dharmendra Tripathi, Jagrati Sahariya, Kamal Nayan Sharma, 2022-09-14 *Energy Conversion and Green Energy Storage* presents recent developments in renewable energy conversion and green energy storage. Covering technical expansions in renewable energy and applications, energy storage and solar photovoltaics, the book features chapters written by global experts in the field. Providing insights related to various forms of renewable energy, the book discusses developments in solar photovoltaic applications. The book also includes simulation codes and programs such as Wien2k code, VASP code, and MATLAB. The book serves as a useful reference for researchers, graduate students, and engineers in the field of energy.

Mathematics Catalog 2005 Neil Thomson, 2004-10 *Advances in Nonlinear Waves and Symbolic Computation* Zhenya Yan, 2009. With the rapid development of science and technology, the computer has become an important tool in many science fields. Particularly symbolic computation, which is one of the most exciting and challenging areas, it has been applied in many sciences such as mathematics, physics, chemistry, biology, mechanics, engineering, etc. in particular non-linear sciences and complex sciences. Nowadays many symbolic computation softwares have been used to deal with these problems. Up to now there have existed many non-linear differential-difference systems related to solitons and chaos in the non-linear science field. In order to understand these complex physical phenomena, it is important to research some of their basic properties. Because of the complexity of these non-linear systems with the symbolic computation, this new book presents important research on non-linear differential-difference systems related to solitons and chaos, as well as other non-linear sciences, in views of constructive algorithms.

Advances In The Homotopy Analysis Method Shijun Liao, 2013-11-26. Unlike other analytic techniques, the Homotopy Analysis Method (HAM) is independent of small/large physical parameters. Besides, it provides great freedom to choose equation type and solution expression of related linear high-order approximation equations. The HAM provides a simple way to guarantee the convergence of solution series. Such uniqueness differentiates the HAM from all other analytic approximation methods. In addition, the HAM can be applied to solve some challenging problems with high nonlinearity. This book, edited by the pioneer and founder of the HAM, describes the current advances of this powerful analytic approximation method for highly nonlinear problems. Coming from different countries and fields of research, the authors of each chapter are top experts in the HAM and its applications.

Beyond Perturbation Shijun Liao, 2003-10-27. Solving nonlinear problems is inherently difficult, and the stronger the nonlinearity, the more intractable solutions become. Analytic approximations often break down as nonlinearity becomes strong, and even perturbation approximations are valid only for problems with weak nonlinearity. This book introduces a powerful new analytic method for nonlinear problems: homotopy analysis, that remains valid even with strong nonlinearity. In Part I, the author starts with a very simple example, then presents the basic ideas, detailed procedures, and the advantages and limitations of homotopy analysis. Part II illustrates the application of homotopy analysis to many interesting nonlinear problems. These range from simple bifurcations of a nonlinear boundary value problem to the Thomas-Fermi atom model, Volterra's population model, Von Karman swirling viscous flow, and nonlinear

progressive waves in deep water Although the homotopy analysis method has been verified in a number of prestigious journals it has yet to be fully detailed in book form Written by a pioneer in its development Beyond Perturbation Introduction to the Homotopy Analysis Method is your first opportunity to explore the details of this valuable new approach add it to your analytic toolbox and perhaps make contributions to some of the questions that remain open **The Mathematical Scientist** ,2005 Comprehensive Dissertation Index ,1984 *Newsletter* New Zealand Mathematical Society,1988 **Dissertation Abstracts International** ,1993-10 *International Aerospace Abstracts* ,1994 **Mathematical Reviews** ,2005 **Government Reports Announcements & Index** ,1996-09 **American Men and Women of Science** ,1971 **Modified Homotopy Analysis Method** Ahmad El-Ajou,2014-06-11 We present a modification of an analytic technique namely the homotopy analysis method HAM to obtain symbolic approximate solutions for linear and nonlinear differential equations of fractional order This method was applied to three examples a fractional oscillation equation a fractional Riccati equation and a fractional Lane Emden equation which were presented as fractional initial value problems FIVPs We extend this modification to provide approximate solutions of linear and nonlinear fractional boundary value problems FBVPs Four examples are tested using the extended approach Also four physical problems are solved using the modification of the HAM The HAM is a strong and easy to use analytic tool for nonlinear problems and does not need small large parameters in the equations Comparison of the results with those of Adomian decomposition method ADM variational iteration method VIM and homotopy perturbation method HPM has led us to significant consequences The obtained results show that the present method is very effective and convenient in solving nonlinear cases and the ADM VIM and HPM are special cases of the HAM *Modified Homotopy Analysis Method* Ahmad Mohammad El-Ajou,2008 *Introduction to Homotopy Theory* Aneta Hajek,2015-08 Homotopy theory which is the main part of algebraic topology studies topological objects up to homotopy equivalence Homotopy equivalence is weaker relations than topological equivalence i e homotopy classes of spaces are larger than homeomorphism classes Even though the ultimate goal of topology is to classify various classes of topological spaces up to a homeomorphism in algebraic topology homotopy equivalence plays a more important role than homeomorphism essentially because the basic tools of algebraic topology homology and homotopy groups are invariant with respect to homotopy equivalence and do not distinguish topologically nonequivalent but homotopic objects The idea of homotopy can be turned into a formal category of category theory The homotopy category is the category whose objects are topological spaces and whose morphisms are homotopy equivalence classes of continuous maps Two topological spaces X and Y are isomorphic in this category if and only if they are homotopy equivalent Then a functor on the category of topological spaces is homotopy invariant if it can be expressed as a functor on the homotopy category Based on the concept of the homotopy computation methods for algebraic and differential equations have been developed The methods for algebraic equations include the homotopy continuation method and the continuation method The methods for differential

equations include the homotopy analysis method In practice there are technical difficulties in using homotopies with certain spaces Algebraic topologists work with compactly generated spaces CW complexes or spectra This book deals with homotopy theory one of the main branches of algebraic topology **The Homotopy Analysis Method for Solving the Korteweg-de Vries (KDV) Equation** Norizzati Salleh,2014

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