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Volterra Integral Equations And Fractional

In mathematics, the Volterra integral equations are a special type of integral equations. They are divided into two groups referred to as the first and the second kind. A linear Volterra equation of the first kind is. $f(t) = \int_a^t K(t,s)x(s)ds$

Volterra integral equation - Wikipedia

During past decades, as the fast development on the study of fractional calculus, the weakly singular Volterra integral equations get more and more attention for their being closely connected with ...

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(PDF) Volterra Integral Equations and Fractional Calculus ...

The rapid development of the theories of Volterra integral and functional equations has been strongly promoted by their applications in physics, engineering and biology. This text shows that the theory of Volterra equations exhibits a rich variety of features not present in the theory of ordinary differential equations. The book is divided into ...

Volterra Integral and Functional Equations by G. Gripenberg

DOI: 10.1216/JIE-2012-24-1-25 Corpus ID: 32030089. Volterra integral equations and fractional calculus: Do neighboring solutions intersect? @article{Diethelm2012VolterraE, title={Volterra integral equations and fractional calculus: Do neighboring solutions intersect?}, author={K. Diethelm and N. Ford}, journal={Journal of Integral Equations and Applications},

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year={2012}, volume={24}, pages ...

[PDF] Volterra integral equations and fractional calculus ...

In this study, Bernstein approximation method has been applied along with Riemann-Liouville fractional integral operator to solve both the second and ...

Numerical analysis of fractional Volterra integral ...

Volterra integral equations of the form $y(t) = \sigma + \int_0^t p(t,s)f(s,y(s))ds$; $\sigma = y_0, z_0$. We give a Theorem that guarantees that the solutions never intersect if $y_0 \neq z_0$ and we discuss several consequences of the main Theorem that concern initial and boundary value problems for the Fractional Calculus. Finally, we give an example

Volterra integral equations and fractional calculus: Do ...

Abstract. Fractional powers of linear multistep methods are suggested for the

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numerical solution of weakly singular Volterra integral equations. The proposed methods are convergent of the order of the underlying multistep method, also in the generic case of solutions which are not smooth at the origin.

Fractional Linear Multistep Methods for Abel-Volterra ...

iteration methods for solving the local fractional Volterra integral equations of the second kind. The general form of this integral equation is given by $(,) X() () ,$
 $0 1 , (1) 1 () () / : d * : ^3 N N N X X \ x a$
 $x x x F d (1.1)$ where $/ (x,N)$ is the kernel of the local fractional integral equation, $\backslash(x)$ and $F(:)$ are known functions, and $:(x)$

A Novel Approach for Solving Volterra Integral Equations ...

Abstract. We discuss the numerical solution to a class of weakly singular Volterra integral equations in this paper. Firstly, the fractional Lagrange

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interpolation is applied to deal with the singularity of the solution, and efficient fractional collocation boundary value methods are developed. Secondly, local convergence estimates are derived from examining the asymptotic property of the solution and the interpolation remainder.

Fractional collocation boundary value methods for the ...

The absolute errors for Example 3 with $m=1, n=5$. Example 4. In this example, we consider a three-dimensional nonlinear Volterra integral equation with fractional order weakly singular kernel: $u(x, y, z) = f(x, y, z) + \int_0^x \int_0^y \int_0^z [u(s, t, w)]^{2(x-s)} (y-t)^{0.3} (z-w)^{0.5} ds dt dw$, where $f(x, y, z) = x + y + z - 20x^7/10y^{1/2}z^{1/5}(11000x^2 + 19800xy + 24750xz + 13644y^2 + 28050yz + 19125z^2)35343$, and the exact solution is $u(x, y, z) = x + y + z$.

Bernstein series solutions of multidimensional linear and ...

To the best of the authors' knowledge,

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nonlinear stochastic Itô-Volterra integral equation driven by fractional Brownian motion has been for the first time solved by using Bernstein polynomials. The obtained numerical results well establish the accuracy and efficiency of the proposed method.

Numerical solution of nonlinear stochastic Itô - Volterra ...

Theory of linear Volterra integral equations A linear Volterra integral equation (VIE) of the second kind is a functional equation of the form $u(t) = g(t) + \int_0^t K(t,s)u(s)ds$, $t \in I := [0, T]$. Here, $g(t)$ and $K(t,s)$ are given functions, and $u(t)$ is an unknown function. The function $K(t,s)$ is called the kernel of the VIE. A linear VIE of the ...

Theory and numerical solution of Volterra functional ...

As it is known the equation
$$A\varphi = f$$

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\mathbb{R}^n with injective compact ...

Comparison between Taylor and perturbed method for ...

Numerical Techniques for Solving Linear Volterra Fractional Integral Equation. Two numerical techniques, namely, Haar Wavelet and the product integration methods, have been employed to give an approximate solution of the fractional Volterra integral equation of the second kind. To test the applicability and efficiency of the numerical method, two illustrative examples with known exact solution are presented.

Numerical Techniques for Solving Linear Volterra ...

Modulating Function-Based System Identification for a Fractional-Order System With a Time Delay Involving Measurement Noise Using Least-Squares Method

Parameter Identification of

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Fractional Order Systems Using ...

of certain integrals and in the solution of fractional singular integral equations of Volterra type. In the following, we may show some applications of integral transform in evaluating certain integrals.

Lemma 1.1 The following relations hold true $\int_0^1 x^{\alpha-1} \exp(\cos x) dx = \int_0^1 x^{\alpha-1} \exp(\cos x) dx$

Solution to Volterra Singular Integral Equations and Non ...

1 INTRODUCTION. Fractional calculus is considered as an important topic due to its real-life applications like biological population model 1 and signal processing. 2 In recent decades, the development of fractional-order ordinary and partial differential equations is increasing significantly, see for example the works of Kilbas et al 3 and Lashkarian and Hejazi, 4 which generalizes the ...

Homotopy perturbation method for solving Caputo-type ...

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Volterra Equations Driven by Semimartingales Protter, Philip, Annals of Probability, 1985; Asymptotic behavior of fractional order Riemann-Liouville Volterra-Stieltjes integral equations Abbas, Saïd, Benchohra, Mouffak, Slimani, Boualem A., and Trujillo, Juan J., Journal of Integral Equations and Applications, 2015

Diethelm , Ford : Volterra integral equations and ...

Recently, these methods have been used as a tool for calculation of fractional derivatives and integrals and to solve Volterra equations with fractional time . In general, spectral methods consist in representation of the solution to the equation under consideration in a finite subspace whereas the exact solution belongs to space of infinite dimension.

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