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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.

$$f(t) = \int_a^t K(t,s)x(s) ds$$

$\{ \displaystyle f(t) = \int_a^t K(t,s)x(s) ds \}$

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## **Volterra integral equation - Wikipedia**

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

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ordinary differential equations. The book is divided into ...

## **Volterra Integral and Functional Equations by G. Gripenberg**

In this paper, using the Riemann-Liouville fractional integral with respect to another function and the  $\psi$ -Hilfer fractional derivative, we propose a fractional Volterra integral equation and the fractional Volterra

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integro-differential  
equation. In this sense,  
for this new fractional  
Volterra

integro-differential  
equation, we study the  
Ulam-Hyers stability  
and, also, the fractional  
...

## **Stability of the fractional Volterra integro-differential**

...

Theory of linear  
Volterra integral  
equations. A linear

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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**



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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

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efficiency of the numerical method, two illustrative examples with known exact solution are presented.

## **Numerical Techniques for Solving Linear Volterra ...**

Keywords: Volterra  
integral equations;  
Local fractional  
variational iteration  
method; Local  
fractional derivative  
operators MSC 2010

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No.: 26A33; 34A12 1.

**Introduction** An integral equation is defined as an equation in which the unknown function  $u(x)$  to be determined appear under the integral sign. The subject of integral equations is one of the most

## **A Novel Approach for Solving Volterra Integral Equations ...**

Abstract. Fractional powers of linear

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multistep methods are suggested for the 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 ...**

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In this paper, we establish a generalized Volterra-Fredholm integral inequality with weakly singular kernel and show its usefulness by applying it to the study of dependence of solutions on the initial data for a class of fractional differential equations involving Fredholm integral operators.

**A generalized**

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**Volterra-Fredholm  
integral inequality  
and ...**

The techniques that are used involve known results concerning Volterra integral equations, and the spaces of summable fractional differentiability introduced by Samko et al.

**(PDF) Fractional  
Integral Equations  
Tell Us How to**

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These polynomials are applied to solve high-order linear differential-difference equations, systems of linear Volterra integral equations, linear and a class of nonlinear Fredholm integro ...

## **Solving Nonlinear Fractional Integro- Differential ...**

1 INTRODUCTION.  
Fractional calculus is considered as an

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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 ...



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## **Homotopy perturbation method for solving Caputo-type ...**

Existence and Uniqueness of the Linear Volterra Fractional Integral Equations of the Second Kind Theorem 4 (see). Under the conditions that the vector functions and are continuous, then, the system of Volterra fractional integral equations of the

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second kind (1) has a unique continuous solution for. The proof is similar to the one in.

## **Existence and Numerical Solution of the Volterra ...**

Fractional Volterra  
Integral Equations

Mutaz Mohammad 1,\* ,

Alexander Trounev 2

and Carlo Cattani 3 1

Department of

Mathematics &

Statistics, Zayed

University, Abu Dhabi

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v.a@edu.kubsau.ru

**An Efficient Method  
Based on Framelets  
for Solving ...**

Keywords Volterra-  
Fredholm Integral  
equation, New iterative  
method, Mixed Volterra-  
Fredholm integral

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equation, Convergence  
Analysis 1. Introduction  
Volterra-Fredholm  
Integral equations have  
received considerable  
interest in the  
Mathematical Physics,  
engineering, biology  
and contact problems  
in the theory of  
elasticity (see [1 -5]).

## **Volterra-Fredholm Integral equation, New iterative method ...**

nonclassical Volterra

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integral equations of the first kind can be found in Apartsyn (2003). In Asanov (1998), problems of regularization, uniqueness and existence of solutions for Volterra integral and operator equations of the first kind are studied. Some properties of ... fractional integral of  $x$ , of order ...

**Fractional**

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**differential  
equations and  
Volterra-Stieltjes ...**

To the best of the authors' knowledge, 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

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proposed method.

**Numerical solution  
of nonlinear  
stochastic Itô -  
Volterra ...**

Volterra Equations  
Driven by  
Semimartingales  
Protter, Philip, Annals  
of Probability, 1985;  
Asymptotic behavior of  
fractional order  
Riemann-Liouville  
Volterra-Stieltjes  
integral equations  
Abbas, Saïd,

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Benchohra, Mouffak,  
Slimani, Boualem A.,  
and Trujillo, Juan J.,  
Journal of Integral  
Equations and  
Applications, 2015

**Diethelm , Ford :**  
**Volterra integral**  
**equations and ...**

Generalization of this  
method to the complex  
fractional Fourier  
transformation case is  
also possible. Directory  
of Open Access  
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Equation Available The  
classical Stieltjes  
transform is modified  
in such a way as to  
generalize both  
Stieltjes and Fourier  
transforms.

**EQUATION INTGRALE  
DE VOLTERRA  
FILETYPE PDF**

We extend and  
generalize results  
obtained by other  
authors in the context  
of fractional differential  
equations. One

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example illustrates the  
theoretical results. ...

dependence and  
continuation of

solutions 45D05:

Volterra integral  
equations [See ...

equations of  
convolution type. ]

Integral Equations

Applications 28 (2016),

no. 4, 441--458 ...

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