

## Discrete Fractional Calculus Applications In Control And Image Processing Series In Computer Vision

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### Discrete Fractional Calculus Applications In

The volume is divided into three main parts. Part one contains a theoretical introduction to the classical and fractional-order discrete calculus where the fundamental role is played by the backward difference and sum. In the second part, selected applications of the discrete fractional calculus in the discrete system control theory are presented. In the discrete system identification, analysis and synthesis, one can consider integer or fractional models based on the fractional-order ...

### Discrete Fractional Calculus: Applications In Control and ...

In the second part, selected applications of the discrete fractional calculus in the discrete system control theory are presented. In the discrete system identification, analysis and synthesis, one can consider integer or fractional models based on the fractional-order difference equations.

### Discrete Fractional Calculus: Applications In Control And ...

Discrete fractional calculus (DFC) has also an important position in the fractional calculus. The nabla operator in DFC is practical for the singular differential equations.

### Discrete Fractional Calculus: Definitions and Applications

In the second part, selected applications of the discrete fractional calculus in the discrete system control theory are presented. In the discrete system identification, analysis and synthesis, one can consider integer or fractional models based on the fractional-order difference equations.

### Discrete Fractional Calculus | Series In Computer Vision

Discrete fractional calculus (DFC) is a straightforward tool for such applications. It holds a feature of non-locality and we now turn to the topic of non-locality combined with fuzzy set theory. But many properties in the classical difference calculus cannot hold and those results in fuzzy or interval analysis cannot be easily extended.

### Discrete fractional calculus for interval-valued systems ...

demonstrate some basic definitions and properties of discrete fractional calculus while developing the simplest discrete fractional variational theory. Some applications of the theory to tumor growth are also studied. The first chapter is a brief introduction to discrete fractional calculus that presents some

### Discrete Fractional Calculus and Its Applications to Tumor ...

Furthermore, discrete fractional calculus has been a vital role in various fields of engineering and scientific applications, including fluid dynamics, plasma physics, nonlinear optics, and protein...

### Discrete Fractional Calculus | Request PDF

Trying to find Applications Of Fractional Calculus In Physics ? Author : R Hilfer Publisher : Wspc Total Pages : 472. Fractional calculus is a collection of relatively little-known mathematical results concerning generalizations of differentiation and integration to noninteger orders. While these results have been accumulated over centuries in ...

### Bruce Wigginton: Read Applications Of Fractional Calculus ...

Fractional derivatives with memory effects have been widely used in image processing. This study investigates a discrete analogy of tempered fractional calculus on an isolated time scale and provides a new kind of discrete fractional calculus. Some useful properties and discrete Mittag-Leffler functions are derived.

### Discrete tempered fractional calculus for new chaotic ...

2. fractional calculus aids signi-cantly in the -elds of viscoelasticity, capacitor theory, electrical circuits, electro-analytical chemistry, neurology, diusion, control theory, and statistics. The theory of fractional calculus for functions of the natural numbers, however, is far less developed.

### The Theory of Discrete Fractional Calculus: Development ...

Fractional calculus is a branch of mathematical analysis that studies the several different possibilities of defining real number powers or complex number powers of the differentiation operator  $D = ()$ ,and of the integration operator  $J = \int ()$ ,and developing a calculus for such operators generalizing the classical one.. In this context, the term powers refers to iterative application of a ...

### Fractional calculus - Wikipedia

Fractional Calculus and its Applications in Applied Mathematics and other Sciences - A Special Issue published by Hindawi

### Fractional Calculus and its Applications in Applied ...

(2017) Discrete and continuous fractional persistence problems – the positivity property and applications. Communications in Nonlinear Science and Numerical Simulation 44 , 424-448. (2017) Robust and adaptive techniques for numerical simulation of nonlinear partial differential equations of fractional order.

### Discretized Fractional Calculus | SIAM Journal on ...

Abstract. In this paper a discrete-time multidimensional fractional calculus of variations is introduced. The fractional operators are defined in the sense of Gr \{\dot{u}\} \ nvald-Letnikov. We derive necessary optimality conditions and then give examples illustrating the use of obtained results.

### Multidimensional Discrete-Time Fractional Calculus of ...

We introduce a stochastic fractional calculus. As an application, we present a stochastic fractional calculus of variations, which generalizes the fractional calculus of variations to stochastic processes. A stochastic fractional Euler&ndash;Lagrange equation is obtained, extending those available in the literature for the classical, fractional, and stochastic calculus of variations. To ...

### A Stochastic Fractional Calculus with Applications to ...

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### Discrete Fractional Calculus And Its Applications To Tumor ...

The author's purpose in this dissertation is to introduce, develop and apply the tools of discrete fractional calculus to the arena of fractional difference equations. To this end, we develop the Fractional Composition Rules and the Fractional Laplace Transform Method to solve a linear, fractional initial value problem in Chapters 2 and 3.

### "The Theory of Discrete Fractional Calculus: Development ...

A unique, comprehensive overview of fractional calculus and its applications With authoritative contributions from the world's leading experts Of interest to mathematicians, physicists, and engineers This multi-volume handbook is the most up-to-date and comprehensive reference work in the field of fractional calculus and its numerous applications.

### Applications in Control » Filmsofts

Fractional Calculus (FC) goes back to the beginning of the theory of differential calculus. Nevertheless, the application of FC just emerged in the last two decades, due to the progress in the area of chaos that revealed subtle relationships with the FC concepts. In the field of dynamical systems theory some work has been carried out but the proposed models and algorithms are still in a ...