

Fractional Dynamics and Control

Fractional Dynamics and Control of Distributed Parameter Systems

J. A. Tenreiro Machado¹, Isabel S. Jesus¹, J. Boaventura Cunha²
and József K. Tar³

¹Institute of Engineering,
Polytechnic Institute of Porto, Porto, Portugal
{jtm, isj}@isep.ipp.pt

²University of Trás-os-Montes and Alto Douro,
Institute of Intelligent Engineering Systems, Vila-Real, Portugal
jboavent@utad.pt

³Institute of Intelligent Engineering Systems,
Budapest Tech, John von Neumann Faculty of Informatics, Budapest, Hungary
tar@nik.bmf.hu

Abstract — *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 preliminary stage of establishment. Having these ideas in mind, the paper discusses a FC perspective in the study of the dynamics and control of some distributed parameter systems.*

1 Introduction

The generalization of the concept of derivative $D^\alpha[f(x)]$ to non-integer values of α goes back to the beginning of the theory of differential calculus. In fact, Leibniz, in his correspondence with Bernoulli, L'Hôpital and Wallis (1695), had several notes about the calculation of $D^{1/2}[f(x)]$. Nevertheless, the development of the theory of Fractional Calculus (FC) is due to the contributions of many mathematicians such as Euler, Liouville, Riemann and Letnikov [1, 2, 3]. The adoption of the FC in control algorithms has been recently studied using the frequency and discrete-time domains [4, 5]. Nevertheless, this research is still giving its first steps and further investigation is required.

This article studies the dynamics and control of classical distributed parameter linear systems. In this perspective, the paper is organized as follows. Section 2 presents the main mathematical aspects of the theory of FC. Section 3 analyzes the dynamics of partial differential equations, corresponding to electrical transmission lines and to heat diffusion systems, on the perspective of FC. Finally, section 4 draws the main conclusions.

295

Fractional Dynamics and Control provides a comprehensive overview of recent advances in the areas of nonlinear dynamics, vibration and control with. Fractional Dynamics and Control provides a comprehensive overview of recent advances in the areas of nonlinear dynamics, vibration and control with Abstract - Authors - Cited By. Fractional Dynamics and Control provides a comprehensive overview of recent advances in the areas of nonlinear dynamics, vibration and. Challenges in fractional dynamics and control theory. Show all authors. Dumitru Baleanu Dumitru Baleanu. 1 Department of Mathematics and Computer. Special Issue: Advances in Fractional Dynamics and Control. Show all authors. Clara Ionescu 1. Clara Ionescu. 1 Department of Electrical energy, Systems and. Full-Text Paper (PDF): Fractional dynamics and control of distributed parameter systems. No mixed research of hybrid and fractional-order systems into a cohesive and multifaceted whole can be found in the literature. This paper focuses on such. Abstract. We introduce a formulation for the time-optimal control problems of systems displaying fractional dynamics in the sense of the. Special issue: advances in fractional dynamics and control in: JOURNAL OF VIBRATION AND CONTROL: JVC; volume: 22; issue: 8; pages. Moreover, it has been found that the dynamical behaviour of many physical systems can be properly .. Fractional dynamics and control. Interests: complex systems; nonlinear dynamics; fractional calculus; modeling; entropy; control; evolutionary computing; genomics. Guest Editor. Prof. We introduce a formulation for the time-optimal control problems of systems displaying fractional dynamics in the sense of the Riemann-Liouville fractional. Fractional Calculus, Delay Dynamics and Networked Control Systems. YangQuan Chen, Director. Center for Self-Organizing and Intelligent. The random walk's guide to anomalous diffusion: a fractional dynamics approach. Ralf Metzler*, Joseph Klafter. School of Chemistry, Tel Aviv University, This paper is concerned with the global relative controllability of fractional dynamical systems with multiple delays in control for finite dimensional spaces. Fractional Dynamics and Control is emerging as a new hot topic of research which draws tremendous attention and great interest. Although the fractional. Fractional dynamics in the trajectory control of redundant manipulators. Maria da Graa Marcos a., Fernando B.M. Duarte c,*, J.A. Tenreiro.thevalleysoftball.com - Buy Fractional Dynamics and Control book online at best prices in India on thevalleysoftball.com Read Fractional Dynamics and Control book reviews. Abstract. In this work we address the dynamic simulation and optimization of chemical Design of a PID-type fractional dynamic matrix control. In the fields of dynamical systems and control theory, a fractional-order system is a dynamical system that can be modeled by a fractional differential equation. PhD student; thesis topic (approximate): Fractional calculus based identification and control of complex dynamic systems;. Further research.

[\[PDF\] Human Behavior in the Social Environment: A Social Systems Approach](#)

[\[PDF\] Complete Guide to Prescription and Nonprescription Drugs 2006 \(Complete Guide to Prescription](#)

[\[PDF\] Magnetisme curatif et massages magnetiques](#)

[\[PDF\] Tales of the Norse Gods \(Oxford Myths and Legends\)](#)

[\[PDF\] Consumer Behavior: Putting the Theory into Practice](#)

[\[PDF\] Vendor Fulfillment Basics: How to Use Vendor Fulfillment to Source for eBay and Amazon Sellers](#)

[\[PDF\] Hematology in Practice](#)