



Fractional-order Systems and Controls: Fundamentals and Applications (Advances in Industrial Control)

By Concepción A. Monje, YangQuan Chen, Blas M. Vinagre, Dingyu Xue, Vicente Feliu-Batlle

Download now

Read Online ➔

Fractional-order Systems and Controls: Fundamentals and Applications (Advances in Industrial Control) By Concepción A. Monje, YangQuan Chen, Blas M. Vinagre, Dingyu Xue, Vicente Feliu-Batlle

Fractional-order Systems and Controls details the use of fractional calculus in the description and modeling of systems, and in a range of control design and practical applications. It is largely self-contained, covering the fundamentals of fractional calculus together with some analytical and numerical techniques and providing MATLAB® codes for the simulation of fractional-order control (FOC) systems. Many different FOC schemes are presented for control and dynamic systems problems. Practical material relating to a wide variety of applications is also provided. All the control schemes and applications are presented in the monograph with either system simulation results or real experimental results, or both. Fractional-order Systems and Controls provides readers with a basic understanding of FOC concepts and methods, so they can extend their use of FOC in other industrial system applications, thereby expanding their range of disciplines by exploiting this versatile new set of control techniques.

↓ [Download Fractional-order Systems and Controls: Fundamental ...pdf](#)

📖 [Read Online Fractional-order Systems and Controls: Fundament ...pdf](#)

Fractional-order Systems and Controls: Fundamentals and Applications (Advances in Industrial Control)

By Concepción A. Monje, YangQuan Chen, Blas M. Vinagre, Dingyu Xue, Vicente Feliu-Batlle

Fractional-order Systems and Controls: Fundamentals and Applications (Advances in Industrial Control) By Concepción A. Monje, YangQuan Chen, Blas M. Vinagre, Dingyu Xue, Vicente Feliu-Batlle

Fractional-order Systems and Controls details the use of fractional calculus in the description and modeling of systems, and in a range of control design and practical applications. It is largely self-contained, covering the fundamentals of fractional calculus together with some analytical and numerical techniques and providing MATLAB® codes for the simulation of fractional-order control (FOC) systems. Many different FOC schemes are presented for control and dynamic systems problems. Practical material relating to a wide variety of applications is also provided. All the control schemes and applications are presented in the monograph with either system simulation results or real experimental results, or both. Fractional-order Systems and Controls provides readers with a basic understanding of FOC concepts and methods, so they can extend their use of FOC in other industrial system applications, thereby expanding their range of disciplines by exploiting this versatile new set of control techniques.

Fractional-order Systems and Controls: Fundamentals and Applications (Advances in Industrial Control) By Concepción A. Monje, YangQuan Chen, Blas M. Vinagre, Dingyu Xue, Vicente Feliu-Batlle
Bibliography

- Sales Rank: #2119723 in Books
- Brand: Brand: Springer
- Published on: 2010-09-09
- Original language: English
- Number of items: 1
- Dimensions: 9.20" h x 1.10" w x 6.10" l, 1.65 pounds
- Binding: Hardcover
- 415 pages

 [Download Fractional-order Systems and Controls: Fundamental ...pdf](#)

 [Read Online Fractional-order Systems and Controls: Fundament ...pdf](#)

Editorial Review

From the Back Cover

Fractional-order Systems and Controls details the use of fractional calculus (calculus of non-integer order) in the description and modeling of systems, and in a range of control design and practical applications. It is largely self-contained, covering the fundamentals of fractional calculus together with some analytical and numerical techniques and providing MATLAB® codes for the simulation of fractional-order control (FOC) systems (available by download from www.springer.com/ISBN). The use of fractional calculus can improve and generalize well-established control methods and strategies. Many different FOC schemes are presented for control and dynamic systems problems. These extend to the challenging control engineering design problems of robust and nonlinear control. Practical material relating to a wide variety of applications including, among others, mechatronics, civil engineering, irrigation and water management, and biological systems is also provided. All the control schemes and applications are presented in the monograph with either system simulation results or real experimental results, or both. Fractional-order Systems and Controls introduces its readers – academic and industrial control researchers interested in mechatronics, nonlinear and robust control, and applications fields from civil engineering to biological systems – to the essentials of FOC and imbues them with a basic understanding of FOC concepts and methods. With this knowledge readers can extend their use of FOC in other industrial system applications, thereby expanding their range of disciplines by exploiting this versatile new set of control techniques.

About the Author

Doctor Concepción A. Monje has been working on fractional derivatives and their applications for over seven years being author and co-author of over 40 technical papers mostly related to fractional-order controllers. Her research area focuses on the tuning and auto-tuning of fractional-order controllers for the control of industrial processes, including servomechanisms, pneumatic and liquid level systems. She has collaborated with the CRONE (Commande Robuste Ordre Non Entier) team from the Ecole Nationale Supérieure d'Électronique, Informatique et Radiocommunications of Bordeaux, publishing several works related to the tuning of fractional-order controllers and co-organizing the 2nd IFAC Workshop on Fractional Differentiation and its Applications (FDA'06). She has also worked on the application of fractional-order controllers to the control of flexible manipulators, in collaboration with the Electrical, Electronic, Control and Communications Engineering Department of the Technic High School of Industrial Engineers of the University of Castilla La-Mancha, Spain. Her collaborations in this field also extend to the Center for Self-Organizing and Intelligent System of the Utah State University, in USA, where she was invited to deliver a research lecture on design of fractional-order controllers to Ph.D. students and a joint public lecture on this topic to members of the IEEE Control Systems Society San Diego Section. She has co-chaired international conferences and she has been a member of international program committees. She has been involved in several international and national research and industrial projects, and she has reviewed articles for several international journals and conferences of relevance. Doctor YangQuan Chen has authored over 200 academic papers plus numerous technical reports. He co-authored two textbooks: "System Simulation Techniques with MATLAB®/Simulink" (with Dingyu Xue . Tsinghua University Press, April 2002, ISBN 7-302-05341-3/TP3137, in Chinese) and "Solving Advanced Applied Mathematical Problems Using Matlab" (with Dingyu Xue. Tsinghua University Press. August 2004. 419 pages in Chinese, ISBN 7-302-09311-3/O.392); and four research monographs: "Plastic Belt for Projectiles" (with Y. Shi. Shaanxi Science and Technology Press, Jan. 1995, ISBN 7-5369-2277-9/TJ.1, in Chinese), "Iterative Learning Control " (with C. Wen . Lecture Notes in Control and Information Sciences, Springer-Verlag, Nov. 1999, ISBN: 1-85233-190-9), "Iterative Learning

Control" (with Hyo-Sung Ahn and Kevin L. Moore. Springer, July 2007, ISBN: 978-1-84628-846-3), and "Optimal Observation for Cyber-physical Systems"(with Zhen Song, Chellury Sastry and Nazif Tas. Springer, July 2009, ISBN: 978-1-84882-655-7). His current research interests include autonomous navigation and intelligent control of a team of unmanned ground vehicles, machine vision for control and automation, distributed control systems (MAS-net : mobile actuator-sensor networks), fractional-order control, interval computation, and iterative/repetitive/adaptive learning control. Currently, he serves as an Associate Editor for IEEE Control Systems Society, Conference Editorial Board (CSSCEB). He was also an Associate Editor of ISA Review Board for AACC 's American Control Conference (ACC2005). He has been the Co-Organizer and Instructor of the Tutorial Workshop on "Fractional-order Calculus in Control and Robotics" at IEEE 2002 Conference on Decision and Control (CDC'02), and a founding member of the ASME subcommittee on "Fractional Dynamics". Doctor Blas M. Vinagre has been working on the area of Fractional Calculus Applications for over 12 years, and he has published over 60 technical papers on this subject. He co-organized the ever first whole day Tutorial Workshop (IEEE Conference on Decision and Control, Las Vegas, December 2002) and the Symposium on Applied Fractional Calculus (Badajoz, October 2007). He has been teacher for tutorial seminars and lecturer for talks on Fractional Calculus Applications at several universities: Technical University of Kosice (Kosice, Slovak Republic 1999), Università degli Studi di Parma (Parma, Italy 2000), Technical University of Lisbon (Lisbon, Portugal 2001), University of Seville (Seville, Spain 1999), Polytechnic University of Madrid (Madrid, Spain 2004), University of Valencia (Valencia, Spain 2005), Royal Academy of Sciences (Madrid, Spain 2005), Polytechnic University of Catalunya (Barcelona, Spain 2008). He has also been Co-Chair of the 2nd IFAC Workshop on Fractional Differentiation and its Applications, Porto, Portugal, July 2006. He is currently involved as Principal Investigator in research projects with the objective of applying FOC to industrial processes, servomechanisms, and autonomous vehicles, and his current interest in the field also includes stability theory, optimal and adaptive control, and implementation issues using FOC. Doctor Dingyü Xue is a Professor of Control Engineering on the Faculty of Information Sciences and Engineering at Northeastern University in Shenyang, China. He is the author of several influential textbooks and monographs on MATLAB® and control in Chinese and two in English, cited by thousands of journal papers and theses. Doctor Vicente Feliu's research interests include multivariable and digital control systems, fractional dynamics and control, kinematic and dynamic control of rigid and flexible robots, mechatronics, and computer vision for robots. He has written about 80 technical papers in refereed international journals and more than 100 communications to international conferences about these subjects. He was awarded with the prize to the best paper published in the Pattern Recognition Journal in 2001, with the Highly Commended Award by the Industrial Robot Journal in 2007, and with the Highly Commended Award by the CLAWAR Conference in 2006. He was also awarded with the Prize to Technical Innovation of Castilla-La Mancha (Spain) in 2003. He has also hold some leading jobs in the Spanish National Research Agency. Regarding fractional calculus, he has worked on modelling and identification of electrochemical and corrosion processes using fractional derivatives, and in the development of frequency domain control design techniques with applications to robotics, mechatronics, hydraulic canals, and electronic converters.

Users Review

From reader reviews:

Concepcion Maldonado:

This Fractional-order Systems and Controls: Fundamentals and Applications (Advances in Industrial Control) book is absolutely not ordinary book, you have after that it the world is in your hands. The benefit you obtain by reading this book is actually information inside this book incredible fresh, you will get details which is getting deeper you actually read a lot of information you will get. This specific Fractional-order Systems and Controls: Fundamentals and Applications (Advances in Industrial Control) without we realize

teach the one who examining it become critical in considering and analyzing. Don't always be worry Fractional-order Systems and Controls: Fundamentals and Applications (Advances in Industrial Control) can bring whenever you are and not make your tote space or bookshelves' become full because you can have it within your lovely laptop even mobile phone. This Fractional-order Systems and Controls: Fundamentals and Applications (Advances in Industrial Control) having great arrangement in word as well as layout, so you will not feel uninterested in reading.

Noel Stevens:

Do you one among people who can't read gratifying if the sentence chained inside straightway, hold on guys this kind of aren't like that. This Fractional-order Systems and Controls: Fundamentals and Applications (Advances in Industrial Control) book is readable by simply you who hate the straight word style. You will find the details here are arrange for enjoyable looking at experience without leaving even decrease the knowledge that want to offer to you. The writer connected with Fractional-order Systems and Controls: Fundamentals and Applications (Advances in Industrial Control) content conveys objective easily to understand by most people. The printed and e-book are not different in the content material but it just different as it. So , do you nonetheless thinking Fractional-order Systems and Controls: Fundamentals and Applications (Advances in Industrial Control) is not loveable to be your top checklist reading book?

Phyllis Thompson:

Information is provisions for folks to get better life, information nowadays can get by anyone at everywhere. The information can be a expertise or any news even an issue. What people must be consider while those information which is within the former life are difficult to be find than now is taking seriously which one is appropriate to believe or which one typically the resource are convinced. If you receive the unstable resource then you buy it as your main information you will have huge disadvantage for you. All those possibilities will not happen throughout you if you take Fractional-order Systems and Controls: Fundamentals and Applications (Advances in Industrial Control) as the daily resource information.

Ronald Folk:

Fractional-order Systems and Controls: Fundamentals and Applications (Advances in Industrial Control) can be one of your beginner books that are good idea. We recommend that straight away because this reserve has good vocabulary which could increase your knowledge in vocab, easy to understand, bit entertaining but nevertheless delivering the information. The author giving his/her effort to put every word into pleasure arrangement in writing Fractional-order Systems and Controls: Fundamentals and Applications (Advances in Industrial Control) yet doesn't forget the main place, giving the reader the hottest in addition to based confirm resource facts that maybe you can be certainly one of it. This great information can easily drawn you into brand-new stage of crucial imagining.

**Download and Read Online Fractional-order Systems and Controls:
Fundamentals and Applications (Advances in Industrial Control)
By Concepción A. Monje, YangQuan Chen, Blas M. Vinagre,
Dingyu Xue, Vicente Feliu-Batlle #6NYQU3CGEO0**

Read Fractional-order Systems and Controls: Fundamentals and Applications (Advances in Industrial Control) By Concepción A. Monje, YangQuan Chen, Blas M. Vinagre, Dingyu Xue, Vicente Feliu-Batlle for online ebook

Fractional-order Systems and Controls: Fundamentals and Applications (Advances in Industrial Control) By Concepción A. Monje, YangQuan Chen, Blas M. Vinagre, Dingyu Xue, Vicente Feliu-Batlle Free PDF download, audio books, books to read, good books to read, cheap books, good books, online books, books online, book reviews epub, read books online, books to read online, online library, greatbooks to read, PDF best books to read, top books to read Fractional-order Systems and Controls: Fundamentals and Applications (Advances in Industrial Control) By Concepción A. Monje, YangQuan Chen, Blas M. Vinagre, Dingyu Xue, Vicente Feliu-Batlle books to read online.

Online Fractional-order Systems and Controls: Fundamentals and Applications (Advances in Industrial Control) By Concepción A. Monje, YangQuan Chen, Blas M. Vinagre, Dingyu Xue, Vicente Feliu-Batlle ebook PDF download

Fractional-order Systems and Controls: Fundamentals and Applications (Advances in Industrial Control) By Concepción A. Monje, YangQuan Chen, Blas M. Vinagre, Dingyu Xue, Vicente Feliu-Batlle Doc

Fractional-order Systems and Controls: Fundamentals and Applications (Advances in Industrial Control) By Concepción A. Monje, YangQuan Chen, Blas M. Vinagre, Dingyu Xue, Vicente Feliu-Batlle Mobipocket

Fractional-order Systems and Controls: Fundamentals and Applications (Advances in Industrial Control) By Concepción A. Monje, YangQuan Chen, Blas M. Vinagre, Dingyu Xue, Vicente Feliu-Batlle EPub

6NYQU3CGEO0: Fractional-order Systems and Controls: Fundamentals and Applications (Advances in Industrial Control) By Concepción A. Monje, YangQuan Chen, Blas M. Vinagre, Dingyu Xue, Vicente Feliu-Batlle