circuits using the standard library cells. Design methods depend strongly on such factors as the FSM used, specific features of the logic elements implemented in the FSM logic circuit, and the characteristics of the control algorithm. PID control effectiveness is usually caused by the nature of dynamic processes, conditioned that the majority of the industrial dynamic processes are well described by simple dynamic models of the first or second order. The efficacy of PID controllers vastly falls in case of control systems with multiple inputs and outputs, the control of which is based on the analysis of various measured quantities in the field of control PID. Consequently, the problems of advanced PID control system design methodologies, rules of adaptive PID control, self-tuning procedures, and particularly robustness and transient performance for nonlinear systems, still remain as the areas of the lively interests for many scientists and researchers at the present time. The recent research results presented in this book provide new ideas for improved performance of PID control applications.

Advances in PID Control - Valery D. Yurkovich - 2011-09-06
Since the foundation and up to the current state of the art in control engineering, the problems of PID control steadily attract great attention of numerous researchers and remain inescapable source of new ideas for processes of control system design. Design methods depend strongly on such factors as the FSM used, specific features of the logic elements implemented in the FSM logic circuit, and the characteristics of the control algorithm. The PID control effectiveness is usually caused by the nature of dynamic processes, conditioned that the majority of the industrial dynamic processes are well described by simple dynamic models of the first or second order.

Getting the books

Read Online A Controller Implementation Using Fpga In Labview Environment

- Alexander Barkalov - 2020-01-08

This book discusses the theory, application, and practice of PID control technology. It is designed for engineers, researchers, engineers, researchers, students of process control, and industry professionals. It will also be of interest for those seeking an overview of the subject of green automation who need to procure simple loop and multi-loop PID controllers and who want to use them in a practical way. The book covers the fundamental aspects necessary to understand PID control technology and, for that reason, it requires no background knowledge of PID control theory. The book is designed in such a way that it is self-contained and can be used as a text for a course in PID control or as a reference book for practitioners. The book is divided into two main parts: Theory and Practice. The first part covers the theory of PID control, and the second part covers the practice of PID control.

Intelligent Neural Network Control System Design and FPGA Based Implementation - Jonathan Turner - 2012

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This book discusses the design and implementation of field-programmable gate arrays (FPGAs) as a method to ensure fast processing operation and to preserve performance of controllers implemented in a full digital system. It goes on to describe basic and advanced levels of programming LabVIEW FPGA and show how implementation of fuzzy-logic control in FPGAs improves system response. A complete toolkit for implementing fuzzy controllers in LabVIEW FPGA has been developed with the book so that readers can generate new fuzzy controllers and deploy them immediately. Problems and their solutions allow readers to practice the techniques and to absorb the theoretical ideas as they arise. Fuzzy Logic Type 1 and Type 2 and Type 1 and Type 2 are both types of FPGAs, where Type 1 is used for applications requiring flexibility in logic design and Type 2 is used for applications requiring high-speed logic design. These standards are maintained and reinforced at ICNC 2007, to be held in Athens, Greece, and in future editions of the conference.

Trends in Advanced Intelligent Control, Optimization and Automation - Wojciech Mlodozeniec - 2017-06-06 This volume contains the proceedings of the KKA 2017 - the 19th Polish Control Conference, organized by the Department of Automatics and Biomedical Engineering, AGH University of Science and Technology in Kraków, Poland, on 28–30 June 2017, where different topics were discussed in the areas of control and Robotics of the Polish Academy of Sciences, and the Commission for Engineering Sciences of the Polish Academy of Arts and Sciences. Part 1 covers the general issues of modeling, control and optimization, including new hardware and software tools, knowledge in control, predictive, dual, etc. control. In turn, Part 2 focuses on optimization, estimation and prediction for control. Part 3 is concerned with autonomous vehicles, while Part 4 addresses applications. Part 5 discusses computer methods in control, and Part 6 examines fractional order calculus in the modeling and control of dynamic systems. Part 7 focuses on modern robotics. Part 8 deals with modeling and identification, while Part 9 deals with problems related to reliability, fault diagnosis, sensor networks and signal processing in automation. Part 10 discusses the use of control tools and techniques in biomedical engineering. Part 11 considers engineering education and teaching with regard to automatic control and robotics.

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Memory Controllers for Mixed-Time-Criticality Systems - Raffaele Scandone - 2016-04-11 This book provides a comprehensive introduction to the use of mixed-time-criticality systems, which are systems in which different tasks or processes have different requirements for their timing and safety properties. It discusses the design and implementation of memory controllers for mixed-time-criticality systems, and how these controllers can be used to ensure that the timing and safety properties of the different tasks or processes are met. The book also includes case studies that demonstrate the practical application of the concepts discussed in the book, and provides guidance on how to implement mixed-time-criticality systems in real-world applications. Finally, it describes some of the latest research in this area, and identifies future research directions.

New Technologies, Development and Application II - Isak Karabegović - 2019-04-23 This book provides a comprehensive introduction to the use of mixed-time-criticality systems, which are systems in which different tasks or processes have different requirements for their timing and safety properties. It discusses the design and implementation of memory controllers for mixed-time-criticality systems, and how these controllers can be used to ensure that the timing and safety properties of the different tasks or processes are met. The book also includes case studies that demonstrate the practical application of the concepts discussed in the book, and provides guidance on how to implement mixed-time-criticality systems in real-world applications. Finally, it describes some of the latest research in this area, and identifies future research directions.

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Smart Techniques for a Smarter Planet - Manoj Kumar Misra - 2019-05-29

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FPGA Fuzzy (Pd & Pid) Controller Models for Insulin Pumps in Diabetes - Harikumar Rajaguru - 2012-06

This book emphasizes on a Field Programmable Gate Array (FPGA) Implementation of Fuzzy PID and PID Controller for biomedical application. A novel approach aims to identify and design a simple robust Fuzzy (Pd and Pid) controller system with minimum number of fuzzy rules, particularly for an automatic feedback control system in which the patient’s blood glucose level is monitored. This controller is an automatic feedback control system in which the patient’s blood glucose level is monitored.

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Field Programmable Gate Array Implementation of Reduced Advanced Digital Feedback Control - National Aeronautics and Space Administration (NASA) - 2018-06-20

This effort was to develop a digital motor controller using field programmable gate arrays (FPGAs). This is a more rigorous approach to a conventional microprocessor digital controller. FPGAs typically have higher radiation (rad) tolerance than both the microprocessor and memory required for a conventional digital controller. Furthermore, FPGAs can typically operate at higher speeds. (While speed is usually not an issue for motor controllers, it is “other than motor power, only a 3.5 V digital power supply was used in the controller; no analog bias supplies were used. Since most of the circuit was implemented in an FPGA, no additional parts were needed other than the power transistors to drive the motor. The benefits of using FPGAs are increased radiation tolerance, reduced weight and cost. King, K. D. Marshall Space Flight Center NASA/TM-2003-212501, NAS 1.15:212501, M-1076)

PD Controller Tuning Using the Magnitude Optimum Criterion - Harikumar Rajaguru - 2012-06-10

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Advances in Soft Computing - Giri Sidoren - 2010-10-13

In this chapter, we present various design techniques that use fuzzy systems to model the human ability of reasoning, usage of human language and organization of knowledge, solving problems and practically all other human intellectual abilities. Usually it is characterized by the application of heuristic methods because in the majority of cases there is no exact solution to this kind of problem. Soft computing can be viewed as a branch of AI that deals with problems that explicitly contain incomplete or complex information, or are known to be impossible to direct computation, i.e., these are the same problems as in AI but viewed from the perspective of their computation. The Mexican International Congress on Artificial Intelligence (MICAI), a yearly international conference series supported by the Mexican Society for Artificial Intelligence (SMA), was held in January 2020. The conference published high-quality papers in all areas of artificial intelligence and its applications. The proceedings of the previous MICAI events were also published by Springer in its Lecture Notes in Artificial Intelligence (LNAI) series, e.g., vol. 3630, 2005; 4280, 2008 and 4855. Since its foundation in 2000, the conference has been growing in popularity and improving in quality.

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International Conference on Intelligent Data Communication Technologies and Internet of Things (ICDICIT) 2018 - Jhende Harikumar - 2018-12-20

This chapter describes data communication and computer networking, communication technologies and the applications of IoT (Internet of Things), Big data, cloud computing and healthcare informatics. It explores, explains, shows, explores, analyzes, and discusses, the data communication, computer networking, communication technologies and IoT. Aimed at researchers and academicians who need to understand the importance of communication and advanced technologies in IoT, offers different perspectives-to help readers increase their knowledge and motivates them to conduct research in the area, highlighting various innovative ideas for future research.

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High-Performance Computing Using FPGAs - Wim Vanderbauwhede - 2013-08-23
High-performance computing using field-programmable gate arrays (FPGAs). This book provides an overview of architectures, tools and applications for High-Performance Reconfigurable Computing (HPRC). FPGAs offer very high I/O bandwidth and fine-grained, custom and flexible parallelism with and without the assistance of a high-performance on-chip memory. This book is intended for both computer architects/designers and engineers who are working on the theoretical and practical research on control theory, and facilitate the proposal of development of new control techniques and its applications. In addition, this book presents educational material for both the students and practicing engineers.

FPGA Implementations of Neural Networks - Aarno R. Osmo - 2006-10-04
During the 1980s and early 1990s there was significant work in the design and implementation of hardware computing engines, DSP applications, reconfigurable fabrics, dynamic reconfiguration, routing and placement, and various problems of artificial intelligence. The book presents in this book is original research work, findings and practical development experiences of researchers.

Intelligent Control, Control and Devices - Rajesh Singh - 2018-03-06
This book focuses on the integration of intelligent communication systems, control devices, and systems related to all aspects of engineering and sciences. It contains high-quality research papers presented at the 2nd international conference, ICCD on Control, Communication and Advanced Technologies in IoT, held in Montpellier, France during 15 and 16 April, 2017. The volume broadens covers recent advances in intelligent communication, intelligent control and intelligent devices. The work presented in this book is original research work, findings and practice development experiences of researchers, academicians, scientists and industrial practitioners.

Field-Programmable Logic and Applications: Reconfigurable Computing Is Going Mainstream - Manfred Greuner - 2003-08-02
This book constitutes the refereed proceedings of the 12th International Conference on Field-Programmable Logic and Applications, FPL 2002, held in Montpellier, France, in September 2002. The 104 revised regular papers and 27 poster papers presented together with three invited contributions were carefully reviewed.
computing engines, DSP applications, reconfigurable fabrics, dynamic reconfiguration, routing and placement, power minimization, synthesis issues, communication applications, new technologies, reconfigurable architectures, multimedia applications, FPGA-based arithmetic, reconfigurable processors, testing and fault tolerance, crypto applications, multitasking, compilation techniques, etc.