Digital Pulse Width Modulation By Thanukamalam Arunachalam

Pulse Width Modulation for Power Converters
Linearisation of High Resolution Pulse Width Modulation Based Digital-to Analogue Converters
Development of Digital and Analogue Systems of Decoding Pulse Width Modulated Data
Fundamentals of HVAC Control Systems
Implementation of an 11-bit Audio Digital Pulse-width Modulator in Two-micron CMOS
Design of a Digitally Controlled Pulse Width Modulator for DC-DC Converter Applications
Some Applications of Pulse Width Modulation to Digital Control Systems Measurements
A Delta-sigma Pulse Width Modulator with Pulse Dithering
An Analog-to-digital Converter Employing Pulse Width Modulation
Digital Pulse-width Modulation in Power Electronic Circuits
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A Micropower Low-distortion Digital Pulse Width Modulator for a Digital Class D Amplifier

Digital pixel sensor (DPS) array based on pulse width modulation (PWM) scheme
The Development of New Pulse-width Modulation Strategies and the Implementation Using a Digital Signal Processor
Digital Control in Power Electronics
Embedded Systems Architecture
Implementation of Pulse Width Modulation Rectifier Using Digital Signal Processor
Pulse Width Modulation
Theory and Implementation of Pulse Width Modulation Speed Control of Brushless DC Motor Using Digital Signal Processor
Digital Wave Synthesis and Pulse Width Modulation in an Inverter Power Supply
Digital Pulse Width Modulation for Class-D Audio Amplifiers

MICHAELA LACI

Pulse Width Modulation for Power Converters John Wiley & Sons
This thesis discusses the prevalent architectures for DPWM in switched mode DC - DC converters. The design of a Hybrid DPWM is presented. The DPWM is 9-bit accurate and is targeted for a Synchronous Buck Converter with a switching frequency of 1.0 MHz. The design supports low power mode(s) for the buck converter in the Pulse Frequency Modulation (PFM) mode as well as other fail-safe features. The design implementation is digital centric making it robust across PVT variations and portable to lower technology nodes. Key target of the design is to reduce design time. The design is tested across large Process (+/- 3 & sigma;), Voltage (1.8V +/- 10%) and Temperature (-55.0 °C to 125 °C) and is in the process of tape-out.
Linearisation of High Resolution Pulse Width Modulation Based Digital-to Analogue Converters Elsevier
* The first single volume resource for researchers in the field who previously had to depend on separate papers and conference records to attain a working knowledge of the subject.
* Brings together the field's diverse approaches into an integrated and comprehensive theory of PWM
Development of Digital and Analogue Systems of Decoding Pulse Width Modulated Data Springer Science & Business Media
This book presents the reader, whether an electrical engineering student in power electronics or a design engineer, some typical power converter control problems and their basic digital solutions, based on the most widespread digital control techniques. The presentation is focused on different applications of the same power converter topology, the half-bridge voltage source inverter, considered both in its single- and three-phase implementation. This is chosen as the case study because, besides being simple and well known, it allows the discussion of a significant spectrum of the more frequently encountered digital control applications in power electronics, from digital pulse width modulation (DPWM) and space vector modulation (SVM), to inverter output current and voltage control. The book aims to serve two purposes: to give a basic, introductory knowledge of the digital control techniques applied

to power converters, and to raise the interest for discrete time control theory, stimulating new developments in its application to switching power converters.

Fundamentals of HVAC Control Systems John Wiley & Sons

A voltage converter changes the voltage of an electrical power source and is usually combined with other components to create a power supply. This title is devoted to the control of static converters, which deals with pulse-width modulation (PWM) techniques, and also discusses methods for current control. Various application cases are treated. The book is ideal for professionals in power engineering, power electronics, and electric drives industries, as well as practicing engineers, university professors, postdoctoral fellows, and graduate students.

Implementation of an 11-bit Audio Digital Pulse-width Modulator in Two-micron CMOS Morgan & Claypool Publishers

This book is focused on the fundamental aspects of analysis, modeling and design of digital control loops around high-frequency switched-mode power converters in a systematic and rigorous manner Comprehensive treatment of digital control theory for power converters Verilog and VHDL sample codes are provided Enables readers to successfully analyze, model, design, and implement voltage, current, or multi-loop digital feedback loops around switched-mode power converters Practical examples are used throughout the book to illustrate applications of the techniques developed Matlab examples are also provided

Design of a Digitally Controlled Pulse Width Modulator for DC-DC Converter Applications John Wiley & Sons

The increased efficiency and quality constraints imposed on electrical energy systems have inspired a renewed research interest in the study of formal approaches to the analysis and control of power electronics converters. Switched systems represent a useful framework for modeling these converters and the peculiarities of their operating conditions and control goals justify the specific classification of “switched electronic systems”. Indeed, idealized switched models of power converters introduce problems not commonly encountered when analyzing generic switched models or non-switched electrical networks. In that sense the analysis of switched electronic systems represents a source for new ideas and benchmarks for switched and hybrid systems generally. Dynamics and Control of Switched Electronic Systems draws on the expertise of an international group of expert contributors to give an overview of recent advances in the modeling, simulation and control of switched electronic systems. The reader is provided with a well-organized source of references and a mathematically-based report of the state of the art in analysis and design techniques for switched power converters. Intuitive language, realistic illustrative examples and numerical simulations help the reader to come to grips with the rigorous presentation of many promising directions of research such as: converter topologies and modulation techniques; continuous-time, discrete-

time and hybrid models; modern control strategies for power converters; and challenges in numerical simulation. The guidance and information imparted in this text will be appreciated by engineers, and applied mathematicians working on system and circuit theory, control systems development, and electronic and energy conversion systems design.

Some Applications of Pulse Width Modulation to Digital Control Systems Measurements John Wiley & Sons

Methods for control of switching power converters by digital means are described in this thesis. In particular, switching converters used to power microprocessors are targeted, requiring both highly efficient operation and accurate voltage regulation. Digital methods are required to meet the power-delivery challenges of future microprocessors. Such methods for the generation of high-resolution pulse-width modulated signals are discussed and a new approach that combines high resolution with a small circuit area is described. Area-efficient methods of generating multiple accurately matched pulse-width modulated signals are described. An implementation with an area overhead that is not dependent on the number of its outputs is introduced, taking advantage of the phased nature of the switching-signals required by a multi-phase power converter. A simple frequency-calibration scheme for a fully-digital controller is also described, allowing the switching-frequency of the power converter to be synchronised to an external clock source. A sensorless phase-current estimation algorithm for multi-phase power converters is introduced. This utilises slow, small perturbations of the pulse-width modulated signals to estimate the relative conductance of the phases. This information can then be used to calculate the phase current values, and with some further calculation, balance their distribution. The algorithm is demonstrated for a three phase converter.

A Delta-sigma Pulse Width Modulator with Pulse Dithering Springer Nature

This book presents the reader, whether an electrical engineering student in power electronics or a design engineer, a selection of power converter control problems and their basic digital solutions, based on the most widespread digital control techniques. The presentation is primarily focused on different applications of the same power converter topology, the half-bridge voltage source inverter, considered both in its single- and three-phase implementation. This is chosen as the test case because, besides being simple and well known, it allows the discussion of a significant spectrum of the most frequently encountered digital control applications in power electronics, from digital pulse width modulation (DPWM) and space vector modulation (SVM), to inverter output current and voltage control, ending with the relatively more complex VSI applications related to the so called smart-grid scenario. This book aims to serve two purposes: (1) to give a basic, introductory knowledge of the digital control techniques applied to power converters; and (2) to raise the interest for discrete time control

theory, stimulating new developments in its application to switching power converters.

An Analog-to-digital Converter Employing Pulse Width Modulation John Wiley & Sons

A hard copy companion to the eLearning course that serves as a practical guide to the principles and characteristics of controls, and how to apply them in the use, selection, specification and design of controls systems.

Digital Pulse-width Modulation in Power Electronic Circuits John Wiley & Sons

This book offers a general approach to pulse width modulation techniques and multilevel inverter topologies. The multilevel inverters can be approximately compared to a sinusoidal waveform because of their increased number of direct current voltage levels, which provides an opportunity to eliminate harmonic contents and therefore allows the utilization of smaller and more reliable components. On the other side, multilevel inverters require more components than traditional inverters and that increases the overall cost of the system. The various algorithms for multilevel neutral point clamped inverter fed induction motor are proposed and implemented, and the results are analyzed. The performance of these algorithms is evaluated in terms of inverter output voltage, current waveforms and total harmonic distortion. Various basic pulse width modulation techniques, features and implementation of space vector pulse width modulation for a two-level inverter, and various multilevel inverter topologies are discussed in detail. This book is extremely useful for undergraduate students, postgraduate students, industry people, scientists of research laboratories and especially for the research scholars who are working in the area of multilevel inverters. Dr. Satish Kumar Peddapelli is Assistant Professor at the Osmania University in Hyderabad, India. His areas of interest are Power Electronics, Drives, Power Converters, Multi Level Inverters and Special Machines.

Pulse Width Modulation In Power Electronics Packt Publishing Ltd

ABSTRACT (con't) : The test results indicated that the timing generator (triangle wave generator) works conceptually but due to parasitics involved with the package and the mismatches associated with the generation of current sources, introduced more delay than what is desired. The architecture also lends itself for further exploration with focus on reducing the switching activity associated with the internal clock. The thesis also concludes with a note on enhancing the design by eliminating the external clock which operates at the switching frequency.

Digital Control in Power Electronics World Scientific

This book provides a theoretical discussion of pulse width modulation (PWM) in power electronic inverters. Pulse width modulation is widely used for the frequency control of speed of ac motors, the design of uninterruptible power supplies (UPS) as well as the integration of renewable energy sources into existing power grid systems. PWM technique is based on approximation of sinusoidal waveforms by sequences (trains) of rectangular pulses whose widths are properly modulated. This width-modulation results in the suppression of low order harmonics at the expense

of amplification of high order harmonics which are suppressed by energy-storage elements in load circuits. The discussion covers various PWM techniques with a focus on the optimal time-domain PWM techniques proposed by the authors.

Power Electronic Converters Walter de Gruyter GmbH & Co KG

Learn to design and develop safe and reliable embedded systems Key Features Identify and overcome challenges in embedded environments Understand the steps required to increase the security of IoT solutions Build safety-critical and memory-safe parallel and distributed embedded systems Book Description Embedded systems are self-contained devices with a dedicated purpose. We come across a variety of fields of applications for embedded systems in industries such as automotive, telecommunications, healthcare and consumer electronics, just to name a few. Embedded Systems Architecture begins with a bird's eye view of embedded development and how it differs from the other systems that you may be familiar with. You will first be guided to set up an optimal development environment, then move on to software tools and methodologies to improve the work flow. You will explore the boot-up mechanisms and the memory management strategies typical of a real-time embedded system. Through the analysis of the programming interface of the reference microcontroller, you'll look at the implementation of the features and the device drivers. Next, you'll learn about the techniques used to reduce power consumption. Then you will be introduced to the technologies, protocols and security aspects related to integrating the system into IoT solutions. By the end of the book, you will have explored various aspects of embedded architecture, including task synchronization in a multi-threading environment, and the safety models adopted by modern real-time operating systems. What you will learn Participate in the design and definition phase of an embedded product Get to grips with writing code for ARM Cortex-M microcontrollers Build an embedded development lab and optimize the workflow Write memory-safe code Understand the architecture behind the communication interfaces Understand the design and development patterns for connected and distributed devices in the IoT Master multitask parallel execution patterns and real-time operating systems Who this book is for If you’re a software developer or designer wanting to learn about embedded programming, this is the book for you. You’ll also find this book useful if you’re a less experienced embedded programmer willing to expand your knowledge.

The Use of Pulse Width Modulation to Control D.C. Motor Speed and Direction

ABSTRACT: We developed a new modulation technique to improve supply ripple rejection of a digital pulse width modulator. This control scheme uses two feedback points (the switching node and the output) to enable a high gain and high bandwidth loop gain at relatively low switching frequencies. This enables a high loop gain for the amplifier, allowing large power supply rejection ratio values, in the order of 65 dB attenuation. This

method shows promise for power supply rejection ratio measurements. With future investigation of the linearity performance (signal to noise, total harmonic distortion, and total harmonic distortion and noise), this technique could be used for high fidelity audio power amplifiers.

Pulse-width Modulated DC-DC Power Converters

Fully worked solutions with clear explanations The Pulse-width Modulated DC-DC Power Converters: Solutions Manual provides solutions to the practice problems in the text. Fully worked, each solution includes formulas and diagrams as necessary to help you understand the approach, and explanations clarify the reasoning behind the correct answer. The solutions are aligned chapter-by-chapter with the text, and provide useful guidance that can help you identify your level of comprehension. Designed to make your study time more productive, this solutions manual is an invaluable tool for anyone studying electricity and electrical engineering.

Digital Pulse Width Modulation

Pulse Width Modulation (PWM) has been used extensively for motor control, DC-AC converters, DC-DC converters and in audio applications. The conventional method of generating a pulse width modulated signal involves generating an accurate sawtooth or triangle wave using analog circuits. In CMOS, being analog circuit intensive puts extra constraints on the fabrication process used for manufacture, thus requiring a higher cost than digital CMOS. Delta-Sigma Modulation on the other hand is analog intensive, but requires only quality capacitor matching, which can be obtained with current digital CMOS processes. This thesis describes a method to generate a digital PWM with pulse dithering using a Delta-Sigma modulator. The Delta-Sigma modulator provides accuracy and allows the circuit to be implemented in a digital CMOS process, while the pulse dithering in the PWM spreads out harmonic noise generated from the PWM fundamental frequency.

Design and Implementation of Mixed Mode Digital Pulse Width Modulator for a DC-DC Converter

The bestselling beginner Arduino guide, updated with new projects! Exploring Arduino makes electrical engineering and embedded software accessible. Learn step by step everything you need to know about electrical engineering, programming, and human-computer interaction through a series of increasingly complex projects. Arduino guru Jeremy Blum walks you through each build, providing code snippets and schematics that will remain useful for future projects. Projects are accompanied by downloadable source code, tips and tricks, and video tutorials to help you master Arduino. You'll gain the skills you need to develop your own microcontroller projects! This new 2nd edition has been updated to cover the rapidly-expanding Arduino ecosystem, and includes new full-color graphics for easier reference. Servo motors and stepper motors are covered in richer detail, and you'll find more excerpts about technical details behind the topics covered in the book. Wireless connectivity and the Internet-of-Things are now more prominently featured in the advanced projects to reflect Arduino's growing

capabilities. You'll learn how Arduino compares to its competition, and how to determine which board is right for your project. If you're ready to start creating, this book is your ultimate guide! Get up to date on the evolving Arduino hardware, software, and capabilities Build projects that interface with other devices—wirelessly! Learn the basics of electrical engineering and programming Access downloadable materials and source code for every project Whether you're a first-timer just starting out in electronics, or a pro looking to mock-up more complex builds, Arduino is a fantastic tool for building a variety of devices. This book offers a comprehensive tour of the hardware itself, plus in-depth introduction to the various peripherals, tools, and techniques used to turn your little Arduino device into something useful, artistic, and educational. Exploring Arduino is your roadmap to adventure—start your journey today!

New Modulation Technique to Improve Supply Ripple Rejection of a Digital Pulse Width Modulator

High Performance Control of AC Drives with Matlab®/Simulink Explore this indispensable update to a popular graduate text on electric drive techniques and the latest converters used in industry The Second Edition of High Performance Control of AC Drives with Matlab®/Simulink delivers an updated and thorough overview of topics central to the understanding of AC motor drive systems. The book includes new material on medium voltage drives, covering state-of-the-art technologies and challenges in the industrial drive system, as well as their components, and control, current source inverter-based drives, PWM techniques for multilevel inverters, and low switching frequency modulation for voltage source inverters. This book covers three-phase and multiphase (more than three-phase) motor drives including their control and practical problems faced in the field (e.g., adding LC filters in the output of a feeding converter), are considered. The new edition contains links to Matlab®/Simulink models and PowerPoint slides ideal for teaching and understanding the material contained within the book. Readers will also benefit from the inclusion of: A thorough introduction to high performance drives, including the challenges and requirements for electric drives and medium voltage industrial applications An exploration of mathematical and simulation models of AC machines, including DC motors and squirrel cage induction motors A treatment of pulse width modulation of power electronic DC-AC converter, including the classification of PWM schemes for voltage source and current source inverters Examinations of harmonic injection PWM and field-oriented control of AC machines Voltage source and current source inverter-fed drives and their control Modelling and control of multiphase motor drive system Supported with a companion website hosting online resources. Perfect for senior undergraduate, MSc and PhD students in power electronics and electric drives, High Performance Control of AC Drives with Matlab®/Simulink will also earn a place in the libraries of researchers working in the field of AC motor drives and power

electronics engineers in industry.

A Digital Pulse Width Modulation for the Modular Structured Multilevel Inverter

Xiv, 81, [4] leaves : ill. ; 30 cm.

High Performance Control of AC Drives with Matlab/Simulink