Digital Waveform Generation

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Digital Signal Generator Teisi Titon 2002

Digital Signal Processing with the TMS320C25 Rulph Chassaing 1990-03-21 A guide to the architecture and instruction set of the TMS320C25. Surveys available software development tools and covers I/O methods, the Z-transform, finite impulse response filters, infinite impulse response filters, the fast Fourier transform and adaptive filtering, all supported by a wealth of examples, projects and applications. Includes real-time algorithm implementations.

Digital Waveform Generation Pete Symons 2013-10-17 This concise overview of digital signal generation will introduce you to powerful, flexible and practical digital waveform generation techniques. These techniques, based on phase-accumulation and phase-amplitude mapping, will enable you to generate sinusoidal and arbitrary real-time digital waveforms to fit your desired waveshape, frequency, phase offset and amplitude, and to design bespoke digital waveform generation systems from scratch. Including a review of key definitions, a brief explanatory introduction to classical analogue waveform generation and its basic conceptual and mathematical foundations, coverage of recursion, DDS, IDFT and dynamic waveshape and spectrum control, a chapter dedicated to detailed examples of hardware design, and accompanied by downloadable Mathcad models created to help you explore 'what if?' design scenarios, this is essential reading for practitioners in the digital signal processing community, and for students who want to understand and apply digital waveform synthesis techniques.

Digital-analog Waveform Generation and Real-time Biological Control Circuitry in Electronic Music Manford L. Eaton 1969

Digital Waveform Generator David Jyn-En Lim 1996

Personal Computer Based Digital Waveform Generator Ali Reza Angha 1987

Practical Digital Signal Processing Edmund Lai 2003-10-21 The aim of this book is to introduce the general area of Digital Signal Processing from a practical point of view with a working minimum of mathematics. The emphasis is placed on the practical applications of DSP: implementation issues, tricks and pitfalls. Intuitive explanations and appropriate examples are used to develop a fundamental understanding of DSP theory, laying a firm

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foundation for the reader to pursue the matter further. The reader will develop a clear understanding of DSP technology in a variety of fields from process control to communications. * Covers the use of DSP in different engineering sectors, from communications to process control * Ideal for a wide audience wanting to take advantage of the strong movement towards digital signal processing techniques in the engineering world * Includes numerous practical exercises and diagrams covering many of the fundamental aspects of digital signal processing

Digital Signal Processing and Applications with the C6713 and C6416 DSK Rulph Chassaing 2004-12-13 This book is a tutorial on digital techniques for waveform generation, digital filters, and digital signal processing tools and techniques The typical chapter begins with some theoretical material followed by working examples and experiments using the TMS320C6713-based DSPStarter Kit (DSK) The C6713 DSK is TI's newest signal processor based on the C6x processor (replacing the C6711 DSK)

Measuring Signal Generators Yu. K. Rybin 2013-12-05 The book brings together the following issues: Theory of deterministic, random and discrete signals reproducible in oscillatory systems of generators; Generation of periodic signals with a specified spectrum, harmonic distortion factor and random signals with specified probability density function and spectral density; Synthesis of oscillatory system structures; Analysis of oscillatory systems with non-linear elements and oscillation amplitude stabilization systems; It considers the conditions and criteria of steady-state modes in signal generators on active four-pole elements with unidirectional and bidirectional transmission of signals and on two-pole elements; analogues of Barkhausen criteria; Optimization of oscillatory system structures by harmonic distortion level, minimization of a frequency error and set-up time of the steady state mode; Theory of construction of random signal generators; Construction of discrete and digital signal generators; Practical design of main units of generators; Practical block diagrams of both analog and digital signal generators.

Digital Signal Processing In High-Speed Optical Fiber Communication Principle and Application Jianjun Yu 2020-07-06 This book presents the principles and applications of optical fiber communication based on digital signal processing (DSP) for both single and multi-carrier modulation signals. In the context of single carrier modulation, it describes DSP for linear and nonlinear optical fiber communication systems, discussing all-optical Nyquist modulation signal generation and processing, and how to use probabilistic and geometrical shaping to improve the transmission performance. For multi-carrier modulation, it examines DSP-based OFDM signal generation and detection and presents 4D and high-order modulation formats. Lastly, it demonstrates how to use artificial intelligence in optical fiber communication. As such it is a useful resource for students, researches and engineers in the field of optical fiber communication.

A Digital Computer Electrocardiogram Waveform Generator Harvey Ataru Iwamoto 1976

Digital Waveform Generator Phillip G. Pflueger 1968

A Three Phase Pulse Width Modulation Waveform Generator Using the TMS320E17 Digital Signal Processor Paul SNEADE 1990

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Digital Signal Processor Waveform Generator for Use in Electrical Impedance Spectroscopy R. M. Mijarez-Castro 1995

110 Waveform Generator Projects for the Home Constructor R. M. Marston 2016-03-16 110 Waveform Generator Projects for the Home Constructor deals with waveform generator circuits that can produce forms of sine, square, triangle, sawtooth, ramp, pulse, or staircase. The generator circuits, built by the constructor using transistors, operational amplifiers or digital integrated circuits, can produce modulated or unmodulated outputs, with single or multiple form outputs. The constructor must follow two requirements in building a simple sine-wave oscillator: firstly, the output of an amplifying device must be fed back to its input via a frequency-selective network in such a way that the sum of the amplifier and feedback network phase-shifts equals zero (or 360) degrees at the desired oscillation frequency. Secondly, the gain of the amplifying device must exactly counter the loss or attenuation of the frequency-selective feedback network at the desired oscillation frequency, to give an overall system gain of precise unity. The book also describes different waveform modulations, such as amplitude modulation (a.m.), frequency modulation (f.m.), frequency-shift keying (f.s.k.), phase-shift keying (p.s.k.), sweep modulation, carrier keying, and how to apply these in practical circuits. Radio technicians, engineers, apprentices, hobbyists, and students of electrical engineering or electronics will find the book very useful.

Multichannel Digital-to-analog Waveform Generation with a Minicomputer Ho Chung Lui 1977

Digital Architectures for Analog Signal Generation Evan Mark Hawrysh 1996 "Analog and mixed-signal testing is far more complex than its digital equivalent. This thesis will identify the analog test requirements through an extensive analysis of integrated circuit testing, possible error sources, and the different levels of test hierarchy. The results will show that analog testing requires spectrally pure, high-quality predictable test signals. These signals are most robust when reproduced through digital techniques such as direct digital frequency synthesis. Delta-sigma ($ Delta Sigma$) modulation is perhaps the most versatile technique, as it can precisely encode arbitrary analog waveforms into a pulse-density modulated (PDM), infinite-length, single bit-wide pattern. The noise-shaping characteristics of the $ Delta Sigma$ modulator also allow for simple reconstruction of the embedded signal. Unfortunately, on-chip signal generation using this method is currently hindered by the high area overhead and limited programmability of $ Delta Sigma$ modulation oscillators. We will introduce the concept of forcing the PDM pattern to be finite in length and thus periodic. Although other periodic encoding algorithms exist, forced-periodic PDM patterns will be shown to be far superior for their precise control over signal amplitude, frequency, phase, and also for their ability to encode an arbitrary waveform. Its effectiveness will be demonstrated with several experiments of single- and multi-tone waveforms of varying degrees of complexity. By creating a fixed-length pattern, we can take advantage of many common digital built-in self-test (BIST) concepts such as scan and RAMBIST, found on most digital and mixed-signal integrated circuits, to supply the necessary hardware. We will show how analog signal generation can be integrated into digital ICs using any or all of the IEEE 1149.1-1990 standard, embedded RAMs, and scan chains. These applications will indeed prove that with very little additional hardware, on-chip, high-quality analog signal gene" --

Josephson Junction Digital Waveform Generation for Very Wideband Radars 1992 The ultimate

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goal of this program is to design, fabricate and test an ultra-wideband DDS based upon superconducting JJ logic technology which has direct insertion applications in present and future DOD Radar, Communication, or ECM systems. The phase I objectives are to define the DDS system parameters, develop the DDS architecture for the identified system, perform detailed circuit designs and a system performance appraisal. In addition, a teaming arrangement with a superconducting foundry will be evaluated for Phase II device evaluation.

Digital Waveform Generation Pete Symons 2013

Linear FM Chirp Waveform Generation Using Digital Sampsles Robert W. Cleveland 1972

Design of a Digital Programmable Physiological Waveform Generator Kenneth J. Fuchs 1975

Linear FM Chirp Waveform Generation Using Digital Samples Robert W. Cleveland 1972

A Digital Waveform Generator for Music Synthesis Steven Mark Christiansen 1976

Transient Waveform Generation for Digital Relay Testing Jeffrey Scott Williams 1992

Digital Waveform Generator with NMR Applications Edward Osoliniec 1979

The Art of Simulation Using PSPICEAnalog and Digital Bashir Al-Hashimi 1995-02-15 This comprehensive volume covers both elementary and advanced analog and digital circuit simulation using PSpice. The text includes many worked examples, circuit diagrams, tables, and code listings. It also compares practical results with those obtained from simulation.

Digital-analog Waveform Generation Manfred L. Eaton 1969

Digital Signal Processing Samir I. Abood 2020-01-20 Digital Signal Processing:A Primer with MATLAB® provides excellent coverage of discrete-time signals and systems. At the beginning of each chapter, an abstract states the chapter objectives. All principles are also presented in a lucid, logical, step-by-step approach. As much as possible, the authors avoid wordiness and detail overload that could hide concepts and impede understanding. In recognition of requirements by the Accreditation Board for Engineering and Technology (ABET) on integrating computer tools, the use of MATLAB® is encouraged in a student-friendly manner. MATLAB is introduced in Appendix C and applied gradually throughout the book. Each illustrative example is immediately followed by practice problems along with its answer. Students can follow the example step-by-step to solve the practice problems without flipping pages or looking at the end of the book for answers. These practice problems test students' comprehension and reinforce key concepts before moving onto the next section. Toward the end of each chapter, the authors discuss some application aspects of the concepts covered in the chapter. The material covered in the chapter is applied to at least one or two practical problems. It helps students see how the concepts are used in real-life situations. Also, thoroughly worked examples are given liberally at the end of every section. These examples give students a solid grasp of the solutions as well as the confidence to solve similar problems themselves. Some of hte problems are solved in two or three ways to facilitate a deeper understanding and comparison of different approaches. Designed for a three-hour semester course, Digital Signal Processing:A Primer with MATLAB® is intended as a textbook for a senior-level undergraduate

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student in electrical and computer engineering. The prerequisites for a course based on this book are knowledge of standard mathematics, including calculus and complex numbers.

Streamlining Digital Signal Processing Richard G. Lyons 2012-05-29 This book presents recent advances in DSP to simplify, or increase the computational speed of, common signal processing operations. The topics describe clever DSP tricks of the trade not covered in conventional DSP textbooks. This material is practical, real-world, DSP tips and tricks as opposed to the traditional highly-specialized, math-intensive, research subjects directed at industry researchers and university professors. This book goes well beyond the standard DSP fundamentals textbook and presents new, but tried-and-true, clever implementations of digital filter design, spectrum analysis, signal generation, high-speed function approximation, and various other DSP functions.

Analog Test Signal Generation Using Periodic ΣΔ-Encoded Data Streams Benoit Dufort 2012-12-06 Analog Test Signal Generation Using Periodic SigmaDelta-Encoded Data Streams presents a new method to generate high quality analog signals with low hardware complexity. The theory of periodic SigmaDelta-encoded bitstreams is presented along with a set of empirical tables to help select the appropriate parameters of a bitstream. An optimization procedure is also outlined to help select a bit sequence with the desired attributes. A large variety of signals can be generated using this approach. Silicon implementation issues are discussed with a specific emphasis on area overhead and ease of design. One FPGA circuit and three different silicon implementations are presented along with experimental results. It is shown that simple designs are capable of generating very high precision signals-on-chip. The technique is further extended to multi-bit signal generation where it is shown how to increase the performance of arbitrary waveform, generators commonly found in past and present-day mixed-signal testers. No hardware modifications are required, only the numbers in memory are changed. Three different calibration techniques to reduce the effects of the AWG's non-linearities are also introduced, together with supporting experimental evidence. The main focus of this text is to describe an area-efficient technique for analog signal generation using SigmaDelta-encoded data stream. The main characteristics of the technique are: High quality signals (SFDR of 110 dB observed); Large variety of signals generated; Bitstreams easily obtained with a fast optimization program; Good frequency resolution, compatible with coherent sampling; Simple and fast hardware implementation; Mostly digital, except an easily testable 1-bit DAC and possibly a reconstruction filter; Memory already available on-chip can be reused, reducing area overhead; Designs can be incorporated into existing CAD tools; High frequency generation.

The Design and Implementation of a Digital Waveform Generator for Application in Functional Electrical Stimulation Andrew Scott Keys 1990

Retargetable Code Generation for Digital Signal Processors Rainer Leupers 2013-03-09 According to market analysts, the market for consumer electronics will con tinue to grow at a rate higher than that of electronic systems in general. The consumer market can be characterized by rapidly growing complexities of appli cations and a rather short market window. As a result, more and more complex designs have to be completed in shrinking time frames. A key concept for coping with such stringent requirements is re-use. Since the re-use of completely fixed large hardware blocks is limited to subproblems of system-level applications (for example MPEG-2), flexible, programmable pro cessors are being used as

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building blocks for more and more designs. Processors provide a unique combination offeatures: they provide flexibility and re-use. The processors used in consumer electronics are, however, in many cases dif ferent from those that are used for screen and keyboard-based equipment, such as PCs. For the consumer market in particular, efficiency of the product plays a dominating role. Hence, processor architectures for these applications are usually highly-optimized and tailored towards a certain application domain.

Digital Communication Signal Generation with Continuous Playback Sugunakumar Raju Kedambadi 1999

Delta-Sigma UHF Digital Waveform Generator 2006 The Naval Research Laboratory (NRL) has developed and built a prototype UHF Digital Waveform Generator (DWG) based on the Delta-Sigma algorithm, which allows arbitrary waveform generation. It provides predicted low phase and spurious noise. Much of the design uses field programmable gate arrays (FPGAs) for single-bit digital waveform generation. Four filter topologies were initially considered, including cascade, hybrid, parallel, and transposed. The cascade and parallel forms were eliminated because they imposed a heavy computational burden on the system. After analyzing the transposed topology, quantization error in higher-order filters led to the selection of the hybrid form of the digital filter because it performed well. A 12th order hybrid filter was selected and implemented using FPGAs. The NRL Development demonstrates that a simple-to-code single-bit Delta-Sigma DWG can cost-effectively provide the same resolution as a 16-bit or greater digital-to-analog converter (DAC) DWG. These results provide the promise of low-cost diverse waveform generation capability in future high-performance Navy radar systems.

High-accuracy Digital to Analog Converter Dedicated to Sine-waveform Generator for Avionic Applications Masood Karimian-Sichany 2013

Variable Amplitude Fatigue Crack Growth Using Digital Signal Processing Technology JK. Donald 2004 An automated variable amplitude fatigue crack growth system has been developed using digital signal processing (DSP) technology to provide waveform generation, command-feedback verification, and crack growth monitoring. The system is designed to interface with existing analog or digital closed-loop servo-hydraulic mechanical test systems. An important parameter in the control of variable amplitude testing is the effect of loading errors on the fatigue crack growth rate response. A damage parameter (?) has been incorporated to quantify the magnitude and effect of loading errors. In this paper, a FALSTAFF, Mini-TWIST, and truncated Mini-TWIST aircraft spectrum were applied to an M(T) crack growth sample to demonstrate the correlation between the damage parameter and fatigue life.

A FPGA Based Delta-sigma Digital Waveform Generator Chunhui Zhang 2011

Advanced Digital Signal Processor Design Study. Volume II. Design Concept T. Allen 1973 This volume describes a design concept of a digital signal processor designed to meet the specified system requirements. The concept uses the techniques recommended as a result of the studies described in Volume I. Each of the following subsystems are described separately: Digital Waveform Generator, IF Conversion, Input Data Management, Matched Filter, Post Processor, Test Sequence Controller, and Control and Interface. In addition, a mechanical design concept, thermal analysis, and reliability analysis for the concept described are included. (Author).

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A Programmable Pulse Generator for In-vitro Neurophysiologic Experiments Frank Licari 2007 The field of neuroscience has grown tremendously in the last twenty years due to advancements in instrumentation. It is now possible to electrically stimulate individual or groups of neurons, and record the results with electrodes and optical imaging techniques. Current methods to control instrumentation using waveform generation encounter many difficulties including cost, complexity, lack of customization, and multiple components to generate complex waveforms. Therefore, it would be advantageous to design a multichannel waveform generation device that can provide analog or digital signals with customizable on times, off times, delays, amplitudes, and number of cycles. A functional Direct Digital Synthesis (DDS) system was developed using a C programmed microcontroller. To begin, parameters were entered in Matlab, and microcontroller timers generated a TTL pulse using an internal oscillator to control the parameters of the waveform. An analog switch selected whether the signal entered a circuit to output a sine or square wave. If a sinusoid was selected the waveform was developed using a frequency divider and eighth order Bessel filter. The original digital or newly formed sine waves were amplitude adjusted using operational and programmable gain amplifiers. The signal was directed to the proper output channel by a set of eight analog switches addressed by a demultiplexer. This accuracy of the digital waveforms was compared with a function generator using an equal duty cycle with a range of times between 0.1ms and 1s, and the waveforms were found to be identical in timing characteristics and amplitude. The ability to generate irregular digital pulses was also tested, and the resolution was excellent over the same timing range. A sinusoid was generated using the Bessel filter and the signal was found to be clean and accurate in amplitude and frequency. The additional requirements of variable initial delay, finite number of pulses, and the ability to output from one of eight channels were also met. Future design improvements may include using a DDS IC for higher timing resolution and a programmable digital to analog converter for more accurate sine wave generation.

Digital Signal Processing Using MATLAB for Students and Researchers John W. Leis 2011-10-14 Quickly Engages in Applying Algorithmic Techniques to Solve Practical Signal Processing Problems With its active, hands-on learning approach, this text enables readers to master the underlying principles of digital signal processing and its many applications in industries such as digital television, mobile and broadband communications, and medical/scientific devices. Carefully developed MATLAB® examples throughout the text illustrate the mathematical concepts and use of digital signal processing algorithms. Readers will develop a deeper understanding of how to apply the algorithms by manipulating the codes in the examples to see their effect. Moreover, plenty of exercises help to put knowledge into practice solving real-world signal processing challenges. Following an introductory chapter, the text explores: Sampled signals and digital processing Random signals Representing signals and systems Temporal and spatial signal processing Frequency analysis of signals Discrete-time filters and recursive filters Each chapter begins with chapter objectives and an introduction. A summary at the end of each chapter ensures that one has mastered all the key concepts and techniques before progressing in the text. Lastly, appendices listing selected web resources, research papers, and related textbooks enable the investigation of individual topics in greater depth. Upon completion of this text, readers will understand how to apply key algorithmic techniques to address practical signal processing problems as well as develop their own signal processing algorithms. Moreover, the text provides a solid foundation for evaluating and applying new digital processing signal techniques as they are developed.

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