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EDN CRC Press

An indispensable guide for engineers and data scientists in design, testing, operation, manufacturing, and maintenance A road map to the current challenges and available opportunities for the research and development of Prognostics and Health Management (PHM), this important work covers all areas of electronics and explains how to: assess methods for damage estimation of components and systems due to field loading conditions assess the cost and benefits of prognostic implementations develop novel methods for in situ monitoring of products and systems in actual life-cycle conditions enable condition-based (predictive) maintenance increase system availability through an extension of maintenance cycles and/or timely repair actions; obtain knowledge of load history for future design, qualification, and root cause analysis reduce the occurrence of no fault found (NFF) subtract life-cycle costs of equipment from reduction in inspection costs, downtime, and inventory Prognostics and Health Management of Electronics also explains how to understand

statistical techniques and machine learning methods used for diagnostics and prognostics. Using this valuable resource, electrical engineers, data scientists, and design engineers will be able to fully grasp the synergy between IoT, machine learning, and risk assessment.

[Design Note Collection](#) CRC Press

This totally reworked book combines two previous books with material on networking. It is a complete guide to programming and interfacing the 8051 microcontroller-family devices for embedded applications.

Motion Planning John Wiley & Sons

In cyber-physical systems (CPS), sensors and embedded systems are networked together to monitor and manage a range of physical processes through a continuous feedback system. This allows distributed computing using wireless devices. Cyber-Physical Systems—A Computational Perspective examines various developments of CPS that are impacting our daily lives and sets the stage for future directions in this domain. The book is divided into six sections. The first section covers the physical infrastructure required for CPS, including sensor networks and embedded systems. The second section addresses energy issues in CPS with the use of supercapacitors and

reliability assessment. In the third section, the contributors describe the modeling of CPS as a network of robots and explore issues regarding the design of CPS. The fourth section focuses on the impact of ubiquitous computing and cloud computing in CPS and the fifth section discusses security and privacy issues in CPS. The final section covers the role of CPS in big data analytics, social network analysis, and healthcare. As CPS are becoming more complex, pervasive, personalized, and dependable, they are moving beyond niche laboratories to real-life application areas, such as robotics, smart grids, green computing, and healthcare. This book provides you with a guide to current CPS research and development that will contribute to a "smarter" planet.

Patents BoD – Books on Demand

For readers of Robot Building for Beginner (Apress, 2002 and 2009), welcome to the next level. Intermediate Robot Building, Second Edition offers you the kind of real-world knowledge that only renowned author David Cook can offer. In this book, you'll learn the value of a robot heartbeat and the purpose of the wavy lines in photocells. You'll find out what electronic part you should sand. You'll discover how a well-placed switch can help a robot avoid obstacles better than a pair of feelers. And you'll avoid mistakes that can cause a capacitor to explode. Want a robot that can

explore rooms, follow lines, or battle opponents in mini-sumo? This book presents step-by-step instructions and circuit and part descriptions so that you can build the robot featured in the book or apply the modules to your own robot designs. Finally, you'll find the complete schematics for Roundabout, a room explorer that requires no programming and uses only off-the-shelf electronics. With Roundabout, you'll use many of the same techniques used by professional robotics engineers, and you'll experience many of the same challenges and joys they feel when a robot "comes to life."

Current Sensing Techniques and Biasing Methods for Smart Power Drivers

Universitätsverlag der TU Berlin

Wireless Medical Systems and Algorithms: Design and Applications provides a state-of-the-art overview of the key steps in the development of wireless medical systems, from biochips to brain-computer interfaces and beyond. The book also examines some of the most advanced algorithms and data processing in the field. Addressing the latest challenges and solutions related to the medical needs, electronic design, advanced materials chemistry, wireless body sensor networks, and technologies suitable for wireless medical devices, the text: Investigates the technological and manufacturing issues associated with the development of wireless medical devices Introduces the techniques and strategies that can optimize the performances of algorithms for medical applications and provide robust results in terms of data reliability Includes a variety of practical examples and case studies relevant to engineers, medical doctors, chemists, and biologists Wireless Medical Systems and Algorithms: Design and Applications not only highlights new technologies for the continuous surveillance of patient health conditions, but also shows how disciplines such as chemistry, biology, engineering, and medicine are merging to produce a new class of smart devices capable of managing and monitoring a wide range of cognitive and physical disabilities.

Intermediate Robot Building Apress

This book is based on the 18 tutorials presented during the 28th workshop on Advances in Analog Circuit Design. Expert designers present readers with information about a variety of topics at the frontier of analog circuit design, including next-generation analog-to-digital converters, high-performance power management systems and technology considerations for advanced IC design. For anyone involved in analog circuit research and development, this book will be a valuable summary of the state-of-the-art in these areas. Provides a summary of the state-of-the-art in analog circuit design, written by experts from industry and academia; Presents material in a tutorial-based format; Includes coverage of next-generation analog-to-digital converters, high-performance power management systems, and technology considerations for advanced IC design.

Switching Power Supplies A - Z Newnes

Electric Vehicles: Prospects and Challenges looks at recent design methodologies and technological advancements in electric vehicles and the integration of electric vehicles in the smart grid environment, comprehensively covering the fundamentals, theory and design, recent developments and technical issues involved with electric vehicles. Considering the prospects, challenges and policy status of specific regions and vehicle deployment, the global case study references make this book useful for academics and researchers in all engineering and sustainable transport areas. Presents a systematic and integrated reference on the essentials of theory and design of electric vehicle technologies Provides a comprehensive look at the research and development involved in the use of electric vehicle technologies Includes global case studies from leading EV regions, including Nordic and European countries China and India

Digitally-Assisted Analog and Analog-Assisted Digital IC Design Elsevier

Discover cutting-edge techniques for next-generation integrated circuit design, and learn how to deliver improved speed, density, power, and cost.

Advances in Analog Circuit Design 2019 IGI Global

The Newnes Know It All Series takes the best of what our authors have written to create hard-working desk references that will be an engineer's first port of call for key information, design techniques and rules of thumb. Guaranteed not to gather dust on a shelf! Field Application engineers need to master a wide area of topics to excel. The Test and Measurement Know It All covers every angle including Machine Vision and Inspection, Communications Testing, Compliance Testing, along with Automotive, Aerospace, and Defense testing. A 360-degree view from our best-selling authors Topics include the Technology of Test and Measurement, Measurement System Types, and Instrumentation for Test and Measurement The ultimate hard-working desk reference; all the essential information, techniques and tricks of the trade in one volume

Handbook of Sensor Networking Springer Science & Business Media

This authoritative new book focuses on recent developments in the instrumentation for sending voltages and currents. It covers new trends and challenges in the field, such as measurements of biocurrents, the increased speed of the components for data taking, testing of computers and integrated circuits where the measurement of rapid voltage and current variations on a very small geometrical scale is necessary. The first chapter concentrates on recent methods to sense voltages and currents, while the rest of the book investigates the applied side, covering for instance electrical power and energy measurements. The main purpose of this volume is to illustrate commonly employed techniques rather than track the scientific evolution and merits and therefore mainly covers patent literature aimed at industrial applications. It is an exciting addition, justifying the series' claim to cover state-of-the-art developments in both the applied and theoretical fields of sensors and actuators. The measurement of voltages and currents is a common task in the field of electricity and electronics. From a technical point of view it is useful to identify schematically different steps of such a measurement. In a first step a voltage or a current is sensed, intermediate steps such as amplification, transmission and further treatment may follow to yield the result in the final step. Today in most cases microprocessors perform the final steps of such measurements. Analog-to digital converters digitise a voltage that is proportional to the value to be measured and a processor performs further computations and handles the storage and the display of the results. The prerequisite for such measurements are sensors or transducers that respond in a known way to the voltage or current to be measured. The emphasis of this book is put on recent developments of the instrumentation for sensing voltages and currents. Aside from the general trend towards smaller, cheaper and more reliable instrumentation, new demands have arisen. New applications, like measurements of biocurrents, ask for higher sensitivities. Computers and integrated circuits pose new challenges. To exploit the increased speed of the components for data taking, suitable sensors are required. The accuracy that can be achieved depends more than ever on the first step, the acquisition of the raw data. The influence of the measurement process on the results becomes more crucial. Testing of integrated circuits themselves is a completely new application. For such tests one has to measure rapid voltage and current variations on very small geometrical scales. Here, as well as in the traditional high voltage applications, contactless measurements play an important role. The organisation of this book is as follows: In the first chapter different methods to sense voltages and currents are described. For the sake of completeness most commonly used methods are mentioned, we concentrate, however, on those developed recently. The chapters address the subject from the side of different applications in which voltages and currents are sensed. Since the main purpose of this publication is to illustrate commonly employed techniques rather than to track the scientific evolution and merits in particular fields, in general those publications that illustrate a particular measurement principle best have been cited. The citation of a particular reference does therefore not imply that this is the first or most pertinent publication in the respective field.

Contributions to the advance of the integration density of CubeSats Springer

This thesis investigates potential technologies to increase the integration density of CubeSats. Observations of the CubeSat market and missions are recorded in order to derive design criteria for high performance single unit CubeSats. A promising approach to increased integration density is relocation of the components of multiple satellite subsystems to form a highly integrated, multi-functional solar panel. Eligible components are usually allocated to the communication system, the electric power system, or the attitude determination and control system. In a joint research project, development, optimization, and miniaturization of those components in order to form a highly integrated, multi-functional solar panel is investigated. The author first summarizes the development work of the project partners for a picosatellite solar antenna and puts it into relation to the overall solar panel design. Advantage of using solar antennas over simple patch antennas is the reduced loss of solar cell area, and hence available electric power, that is usually accompanied by the usage of higher frequency bands for broadband payload data transmission. Magnetic attitude actuators are the backbone of CubeSat attitude control. In order to increase their performance and lower their resource consumption, numerical optimization of the commonly used three coil types is investigated by the author. This leads to the formulation of a novel optimization approach, which is better suited to real-world considerations for magnetic actuator design. Results from the application of the optimization procedure show potential for every coil type. The state of the art of a novel type of attitude control actuators, so-called fluid-dynamic actuators which are based on angular momentum exchange, is advanced by the author by introducing miniaturized 3D-

printed conduits for single unit CubeSat applications. Following development and functional verification, actuators are compared to existing reaction wheel systems, which shows their superiority for agile attitude maneuvers and integration with the satellite bus. Further investigation exploits additive manufacturing technologies to create redundancy concepts using four actuators with three-dimensional conduits. Finally, development, optimization, and miniaturization of subsystem components is brought together in the design, assembly, and test of a highly integrated, multi-functional solar panel. Analysis of a single unit CubeSat design that applies different configurations of the multi-functional solar panel shows the potential for more than 50% payload mass and payload volume. This brings integration density of single unit CubeSats to a level similar to that of the larger triple unit form factors currently employed for the New Space mega-constellations. Diese Dissertation untersucht mögliche Technologien zur Erhöhung der Integrationsdichte von CubeSats. Beobachtungen des CubeSat-Marktes und ausgewählter Missionen werden zusammengetragen um Entwurfskriterien für hochperformante 1U CubeSats abzuleiten. Ein vielversprechender Ansatz zur Erhöhung der Integrationsdichte ist der Umzug von Komponenten verschiedener Satellitensubsysteme auf ein zu entwickelndes hochintegriertes, multifunktionales Solarpaneel. Infrage kommende Komponenten sind für gewöhnlich dem Kommunikationssystem, dem Energieversorgungssystem, oder dem Lageregelungssystem zugeordnet. In Rahmen eines gemeinschaftlichen Forschungsvorhabens wurden Entwicklung, Optimierung, und Miniaturisierung ausgewählter Komponenten eines solchen hochintegrierten, multifunktionalen Paneels untersucht. Durch den Autor wird zunächst die Entwicklung einer Solarantenne für Picosatelliten durch den Projektpartner zusammengefasst und in Zusammenhang um Entwurf des Solarpaneels gebracht. Der Vorteil einer Solarantenne gegenüber einer einfachen Patch-Antenne ist der geringere Verlust an Solarzellenfläche, und damit zur Verfügung stehender elektrischer Leistung, der üblicherweise mit der Verwendung höherer Frequenzbänder zur breitbandigen Nutzlastdatenübertragung einhergeht. Magnetische Lageregelungsaktuatoren bilden das Rückgrat der CubeSat-Lageregelung. Um deren Leistungsfähigkeit zu erhöhen und den Ressourcenverbrauch zu verringern, wird durch den Autor die numerische Optimierung der drei gebräuchlichen Spulentypen untersucht. Dies führt zur Formulierung eines neuartigen Optimierungsansatzes welcher besser für die Anwendung realer Entwurfsprobleme geeignet ist. Die Optimierungsergebnisse zeigen ein großes Potential für die Optimierung aller betrachteter Spulentypen auf. Der Stand der Technik im Bereich neuartiger Lageregelungsaktuatoren, den sogenannten fluiddynamischen Aktuatoren die auf Drehimpulsaustausch basieren, wird durch den Autor durch die Einführung miniaturisierter 3D-gedruckter Kanäle für die Verwendung auf 1U CubeSats vorgebracht. Im Anschluss an die Entwicklung und funktionale Verifikation werden diese Aktuatoren mit existierenden Reaktionsradsystemen verglichen, was deren Überlegenheit bei agilen Lageregelungsmanövern und der Integration in den Satellitenbus aufzeigt. Weitere Untersuchungen nutzen die additiven Herstellungsverfahren zur Darstellung von redundanten Konzepten bestehend aus vier Aktuatoren mit dreidimensionalen Kanalgeometrien. Abschließend werden Entwicklung, Optimierung und Miniaturisierung der Subsystemkomponenten im Entwurf, Aufbau und Test eines hochintegrierten, multifunktionalen Seitenwandpaneels zusammengeführt. Die Analyse eines 1U CubeSat-Entwurfs unter Verwendung verschiedener Konfigurationen des multifunktionalen Solarpaneels zeigt ein Potential für jeweils mehr als 50% verfügbarer Nutzlastmasse und Nutzlastvolumen vom gesamten Satelliten. Dies hebt die Integrationsdichte von 1U CubeSats auf ein ähnliches Niveau der 3U Formfaktoren, welche gegenwärtig bei den New Space Megakonstellationen zur Anwendung kommen. **Medical Imaging: Concepts, Methodologies, Tools, and Applications** Cambridge University Press Analog circuit and system design today is more essential than ever before. With the growth of digital systems, wireless communications, complex industrial and automotive systems, designers are being challenged to develop sophisticated analog solutions. This comprehensive source book of circuit design solutions aids engineers with elegant and practical design techniques that focus on common analog challenges. The book's in-depth application examples provide insight into circuit design and application solutions that you can apply in today's demanding designs. This is the companion volume to the successful Analog Circuit Design: A Tutorial Guide to Applications and Solutions (October 2011), which has sold over 5000 copies in its the first 6 months of since publication. It extends the Linear Technology collection of application notes, which provides analog experts with a full collection of reference designs and problem solving insights to apply to their own engineering challenges Full support package including online resources (LTSpice) Contents include more application notes on power management, and data conversion and signal

conditioning circuit solutions, plus an invaluable circuit collection of reference designs

Cyber-Physical Systems Newnes

The design of Switching Power Supplies has become one of the most crucial aspects of power electronics, particularly in the explosive market for portable devices. Unfortunately, this seemingly simple mechanism is actually one of the most complex and under-estimated processes in Power Electronics. Switching power conversion involves several engineering disciplines: Semiconductor Physics, Thermal Management, Control Loop theory, Magnetics etc, and all these come into play eventually, in ways hard for non-experts to grasp. This book grows out of decades of the author's experience designing commercial power supplies. Although his formal education was in physics, he learned the hard way what it took to succeed in designing power supplies for companies like Siemens and National Semiconductor. His passion for power supplies and his empathy for the practicing or aspiring power conversion engineer is evident on every page. * The most comprehensive study available of the theoretical and practical aspects of controlling and measuring Electromagnetic Interference in switching power supplies, including input filter instability considerations. * Step-by-step and iterative approach for calculating high-frequency losses in forward converter transformers, including Proximity losses based on Dowell's equations. * Thorough, yet uniquely simple design flow-chart for building DC-DC converters and their magnetic components under typical wide-input supply conditions * Step-by-step, solved examples for stabilizing control loops of all three major topologies, using either transconductance or conventional operational amplifiers, and either current-mode or voltage-mode control.

Hardware Security Springer

This book describes how the principle of self-sufficiency can be applied to a reconfigurable modular robotic organism. It shows the design considerations for a novel REPLICATOR robotic platform, both hardware and software, featuring the behavioral characteristics of social insect colonies. Following a comprehensive overview of some of the bio-inspired techniques already available, and of the state-of-the-art in re-configurable modular robotic systems, the book presents a novel power management system with fault-tolerant energy sharing, as well as its implementation in the REPLICATOR robotic modules. In addition, the book discusses, for the first time, the concept of "artificial energy homeostasis" in the context of a modular robotic organism, and shows its verification on a custom-designed simulation framework in different dynamic power distribution and fault tolerance scenarios. This book offers an ideal reference guide for both hardware engineers and software developers involved in the design and implementation of autonomous robotic systems.

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Electronic Engineering John Wiley & Sons

Next-Generation ADCs, High-Performance Power Management, and Technology Considerations for Advanced Integrated Circuits Advances in Analog Circuit Design 2019 Springer Nature
Power Supplies for LED Driving Newnes

This volume contains selected revised and extended research articles written by prominent researchers who participated in the International MultiConference of Engineers and Computer Scientists 2016, held in Hong Kong, 16-18 March 2016. Topics covered include engineering physics, communications systems, control theory, automation, engineering mathematics, scientific computing, electrical engineering, and industrial applications. The book showcases the tremendous advances in engineering technologies and applications, and also serves as an excellent reference work for researchers and graduate students working on engineering technologies, physical sciences and their applications.

A Computational Perspective Elsevier

I write this book for all the people who believe that link between technology and humans can create a better world. I believe that fast advancement of the technology will help our planet to solve many problems in a more fast smart way that what human brain is capable to do. All this because of fast development of microprocessor architecture and advanced AI algorithms and improvement of neuronal network. I create this book to bring to the large public new idea's and new concept's about hardware and software design that are new concept's at the time of writing this book. This book will be improved in future looking that new technology, hardware and software are developed so fast and everything can change dramatically from 6 to 6 month's.

Transactions on Engineering Technologies CRC Press

This book provides readers with a single-source reference to current sensing integrated circuit design. It is written in handbook style, including systematic guidelines and implementation examples. The authors focus on the implementation of wide-bandwidth current sensing on a single microchip, toward usage in applications such as sensing, control and optimization of the energy flow in growth areas like industrial electronics, renewable energies, smart grids, electromobility and the Internet of Things. Provides readers with a comprehensive, all-in-one source for current sensing integrated circuit design, including implementation examples; Discusses modeling and optimization of on-chip Rogowski coil and Hall sensor in both lateral and vertical orientation; Includes noise reduction techniques, such as auto-zeroing and chopping; Covers open-loop and closed-loop sensor front-end design; Presents the first on-chip current sensor with a planar coil placed besides a power line to measure internal signal currents and the first off-chip current sensor with a helix-shaped coil for external signal currents in the multi-MHz region.

EDN with EEE Newnes

The operational amplifier ("op amp") is the most versatile and widely used type of analog IC, used in audio and voltage amplifiers, signal conditioners, signal converters, oscillators, and analog computing systems. Almost every electronic device uses at least one op amp. This book is Texas Instruments' complete professional-level tutorial and reference to operational amplifier theory and applications. Among the topics covered are basic op amp physics (including reviews of current and voltage division, Thevenin's theorem, and transistor models), idealized op amp operation and configuration, feedback theory and methods, single and dual supply operation, understanding op amp parameters, minimizing noise in op amp circuits, and practical applications such as instrumentation amplifiers, signal conditioning, oscillators, active filters, load and level conversions, and analog computing. There is also extensive coverage of circuit construction techniques, including circuit board design, grounding, input and output isolation, using decoupling capacitors, and frequency characteristics of passive components. The material in this book is applicable to all op amp ICs from all manufacturers, not just TI. Unlike textbook treatments of op amp theory that tend to focus on idealized op amp models and configuration, this title uses idealized models only when necessary to explain op amp theory. The bulk of this book is on real-world op amps and their applications; considerations such as thermal effects, circuit noise, circuit buffering, selection of appropriate op amps for a given application, and unexpected effects in passive components are all discussed in detail. *Published in conjunction with Texas Instruments *A single volume, professional-level guide to op amp theory and applications *Covers circuit board layout techniques for manufacturing op amp circuits.

Electric Vehicles: Prospects and Challenges Elsevier

Power Supplies for LED Driving, Second Edition explores the wide use of light-emitting diodes due to their efficient use of power. The applications for power LEDs include traffic lights, street lamps, automotive lighting, architectural lights, theatre lighting, household light replacements, signage lighting (replacing neon strip lights and fluorescent tubes), LCD display backlighting, and many more. Powering (driving) these LED's is not always simple. Linear driving is inefficient and generates far too much heat. With a switching supply, the main issues are EMI, efficiency, and of course cost. This book covers the design trade-offs involved in LED driving applications, from low-power, to UB-LEDs and beyond. Provides a practical, hands-on approach to power supply design for LED drivers Contains detailed examples of what works throughout the design process Presents commentary on how the calculated component value compares with the actual value used, including a description of why the choice was made