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Biologically-Inspired Energy Harvesting through Wireless Sensor Technologies -

Ponnusamy, Vasaki 2016-04-05

The need for sustainable sources of energy has become more prevalent in an effort to conserve natural resources, as well as optimize the performance of wireless networks in daily life.

Renewable sources of energy also help to cut costs while still

providing a reliable power sources. Biologically-Inspired Energy Harvesting through Wireless Sensor Technologies highlights emerging research in the areas of sustainable energy management and transmission technologies. Featuring technological advancements in green technology, energy harvesting, sustainability, networking, and autonomic computing, as well

as bio-inspired algorithms and solutions utilized in energy management, this publication is an essential reference source for researchers, academicians, and students interested in renewable or sustained energy in wireless networks.

Wireless Power/Data Transfer, Energy Harvesting System Design - Byunghun Lee

2021-08-31

This book focuses on emerging wireless power/data and energy harvesting technologies, and highlights their fundamental requirements, followed by recent advancements. It provides a various technical overview and analysis of key techniques for wireless power/data and energy harvesting system design. The state-of-the-art system introduced in this book will benefit designers looking to develop wireless power transfer and energy harvesting technologies in a variety of fields, such as wearable, implantable devices, home appliances, and electric vehicles.

Underwater Wireless Power Transfer - Taofeek Orekan
2018-12-12

This book discusses, for the first time, wireless power transfer in the ocean environment. Topics covered include power electronic techniques, advanced control strategies, as well as classic and emerging applications such as smart ocean energy systems and wireless power transfer and charging of underwater autonomous vehicles. Emerging research topics are presented, along with methodologies, approaches, and industrial development of intelligent and energy-efficient techniques. Apart from the basic principles with an emphasis on inductive power transfer and mathematical analysis, the book discusses the emerging implementation for underwater wireless power transfer such as energy encryption, power and data transfer through common links, and secured data- and cyber-security. Specifically, the book comprehensively introduces significant

discussions on UWPT coil theoretical and experimental analysis in seawater, optimal design, and intelligent controls. For example, since fast communication is not viable in an underwater environment, the proposed book discusses Maximum Power Efficiency Tracking (MPET) control, which achieves a maximum power efficiency (>85%) without communication or feedback from the transmitting side of the UWPT system. A k-nearest-neighbors-based machine learning approach is used to estimate the coupling coefficient between the coils. This machine learning-based intelligent control method can offer important guidance for graduate students, academic researchers, and industrial engineers who want to understand the working principles and realize the developing trends in underwater wireless power transfer. Finally, the book includes details on the modeling and design of a smart ocean energy system--a new type of power harvesting

system designed to convert ocean energy into electricity, which has the capability of making underwater wireless power connections with distributed marine devices.

Key Technologies of Magnetically-Coupled Resonant Wireless Power Transfer - Yiming Zhang
2017-12-21

This thesis focuses on the key technologies involved in magnetically coupled Wireless Power Transfer (WPT). Starting from the basic structures and theories of WPT, it addresses four fundamental aspects of these systems. Firstly, it analyzes the factors affecting transfer efficiency and compares various methods for reducing the working frequency. Secondly, it discusses frequency splitting and offers a physical explanation. Thirdly, it proposes and assesses three multiple-load transfer structures. Lastly, it investigates WPT systems with active voltage-source and current-source load. As such, the thesis offers readers a

deeper understanding of WPT technology, while also proposing insightful new advances.

Wireless Power Transfer for Medical Microsystems -

Tianjia Sun 2013-06-12

This book provides an in-depth introduction to the newest technologies for designing wireless power transfer systems for medical applications. The authors present a systematic classification of the various types of wireless power transfer, with a focus on inductive power coupling. Readers will learn to overcome many challenges faced in the design a wirelessly powered implant, such as power transfer efficiency, power stability, and the size of power antennas and circuits. This book focuses exclusively on medical applications of the technology and a batteryless capsule endoscopy system and other, real wirelessly powered systems are used as examples of the techniques described.

Wireless Power Transfer Technologies for Electric

Vehicles - Xi Zhang 2022-01-22

This book introduces the most state-of-the-art wireless power transfer technologies for electric vehicles from the fundamental theories to practical designs and applications, especially on the circuit analysis methods, resonant compensation networks, magnetic couplers, and related power electronics converters. Moreover, some other necessary design considerations, such as communication systems, detection of foreign and living objects, EMI issues, and battery charging strategies, are also introduced to provide sufficient insights into the industrial applications. Finally, some future points are mentioned in brief. Different from other works, all the WPT technologies in this book are applied in real EV applications, whose effectiveness and reliability have been already tested and verified. From this book, readers who are interested in the area of wireless power transfer can have a broad view of modern

WPT technologies. Readers who have no experience in the WPT area can learn the basic concept, analysis methods, and design principles of the WPT system for EV charging. Even for the readers who are occupied in this area, this book also provides rich knowledge on engineering applications and future trends of EV wireless charging.

Practical Wireless

Telegraphy - Elmer Eustice Bucher 1917

Wireless Power Transfer via Radiowaves - Naoki Shinohara 2014-01-17

Recent advances in Wireless Power Transmission (WPT) technologies have enabled various engineering applications with potential product implementation. WPT can be utilized to charge batteries in various pieces of equipment without the need for a wired connection. Energy can be harvested from ambient RF and microwave radiation and 1 million kW microwaves can be transmitted from space to the ground. This book covers all

the theory and technologies of WPT, such as microwave generators with semi-conductors and microwave tubes, antennas, phased arrays, beam efficiency, and rectifiers (rectenna). The authors also discuss coupling WPT.

Applications, such as energy harvesting, sensor networks, point-to-point WPT, WPT to moving targets (airplane, vehicle, etc.) and Solar Power Satellite are also presented.

Wireless Information and Power Transfer - Derrick Wing Kwan Ng 2019-01-29

em style="mso-bidi-font-style: normal;"*Wireless Information and Power Transfer* offers an authoritative and comprehensive guide to the theory, models, techniques, implementation and application of wireless information and power transfer (WIPT) in energy-constrained wireless communication networks. With contributions from an international panel of experts, this important resource covers the various aspects of WIPT systems such as, system modeling, physical layer

techniques, resource allocation and performance analysis. The contributors also explore targeted research problems typically encountered when designing WIPT systems.

Transportation and Power Grid in Smart Cities -

Hussein T. Mouftah 2018-11-28

With the increasing worldwide trend in population migration into urban centers, we are beginning to see the emergence of the kinds of mega-cities which were once the stuff of science fiction. It is clear to most urban planners and developers that accommodating the needs of the tens of millions of inhabitants of those megalopolises in an orderly and uninterrupted manner will require the seamless integration of and real-time monitoring and response services for public utilities and transportation systems. Part speculative look into the future of the world's urban centers, part technical blueprint, this visionary book helps lay the groundwork for the communication networks and

services on which tomorrow's "smart cities" will run. Written by a uniquely well-qualified author team, this book provides detailed insights into the technical requirements for the wireless sensor and actuator networks required to make smart cities a reality.

Wireless World - 1926

Wireless-Powered Communication Networks -

Dusit Niyato 2016-11-17

A comprehensive introduction to architecture design, protocol optimization, and application development.

Applications of Energy Harvesting Technologies in Buildings - Joseph W. Matiko 2017-01-31

This timely new resource explores the available energy sources within commercial and residential buildings and the available technologies for energy harvesting. Energy harvesting within built environments is presented using strong research and commercial examples. This book includes clear and concise case studies on solar cell

powered sensor nodes for emotion monitoring systems in ambient assistive living environments and inductive/RF power transfers.

Thermoelectric energy harvesting and power management circuit design, airflow and vibration energy harvesting is also explored. The book concludes with a look at the future of energy harvesting in buildings.

CMOS Integrated Circuit Design for Wireless Power

Transfer - Yan Lu 2017-08-15

This book presents state-of-the-art analog and power management IC design techniques for various wireless power transfer (WPT) systems. To create elaborate power management solutions, circuit designers require an in-depth understanding of the characteristics of each converter and regulator in the power chain. This book addresses WPT design issues at both system- and circuit-level, and serves as a handbook offering design insights for research students and engineers in the integrated

power electronics area.

Proceedings of the 2015 International Conference on Communications, Signal Processing, and Systems -

Qilian Liang 2016-06-22

This book brings together papers presented at the 4th International Conference on Communications, Signal Processing, and Systems, which provides a venue to disseminate the latest developments and to discuss the interactions and links between these multidisciplinary fields.

Spanning topics ranging from Communications, Signal Processing and Systems, this book is aimed at undergraduate and graduate students in Electrical Engineering, Computer Science and Mathematics, researchers and engineers from academia and industry as well as government employees (such as NSF, DOD, DOE, etc).

Recent Wireless Power Transfer Technologies - Pedro Pinho 2020-03-04

The Wireless Power Transfer concept is continuously and

rapidly evolving and new challenges arise every day. As a result of these rapid changes, the need for up-to-date texts that address this growing field from an interdisciplinary perspective persists. This book, organized into ten chapters, presents interesting novel solutions in the exploitation of the near- and far-field techniques of wireless power transfer that will be used in the near future, as well as a bird's eye view of some aspects related to an emerging technological area that will change our lives and will change the paradigm of how we use electrical equipment. The book covers the theory and also the practical aspects of technology implementation in a way that is suitable for undergraduate and graduate-level students, as well as researchers and professional engineers.

Proceedings of the Future Technologies Conference (FTC) 2018 - Kohei Arai
2018-10-17

The book, presenting the proceedings of the 2018 Future

Technologies Conference (FTC 2018), is a remarkable collection of chapters covering a wide range of topics, including, but not limited to computing, electronics, artificial intelligence, robotics, security and communications and their real-world applications. The conference attracted a total of 503 submissions from pioneering researchers, scientists, industrial engineers, and students from all over the world. After a double-blind peer review process, 173 submissions (including 6 poster papers) have been selected to be included in these proceedings. FTC 2018 successfully brought together technology geniuses in one venue to not only present breakthrough research in future technologies but to also promote practicality and applications and an intra- and inter-field exchange of ideas. In the future, computing technologies will play a very important role in the convergence of computing, communication, and all other

computational sciences and applications. And as a result it will also influence the future of science, engineering, industry, business, law, politics, culture, and medicine. Providing state-of-the-art intelligent methods and techniques for solving real-world problems, as well as a vision of the future research, this book is a valuable resource for all those interested in this area.

Innovative Materials and Systems for Energy Harvesting Applications - Mescia, Luciano
2015-04-30

Wearable electronics, wireless devices, and other mobile technologies have revealed a deficit and a necessity for innovative methods of gathering and utilizing power. Drawing on otherwise wasted sources of energy, such as solar, thermal, and biological, is an important part of discovering future energy solutions. Innovative Materials and Systems for Energy Harvesting Applications reports on some of the best tools and technologies available for powering

humanity's growing thirst for electronic devices, including piezoelectric, solar, thermoelectric, and electromagnetic energies. This book is a crucial reference source for academics, industry professionals, and scientists working toward the future of energy.

Wireless Power Transfer Algorithms, Technologies and Applications in Ad Hoc Communication Networks -

Sotiris Nikolettseas 2016-11-18

This book is the first systematic exposition on the emerging domain of wireless power transfer in ad hoc communication networks. It selectively spans a coherent, large spectrum of fundamental aspects of wireless power transfer, such as mobility management in the network, combined wireless power and information transfer, energy flow among network devices, joint activities with wireless power transfer (routing, data gathering and solar energy harvesting), and safety provisioning through electromagnetic radiation

control, as well as fundamental and novel circuits and technologies enabling the wide application of wireless powering. Comprising a total of 27 chapters, contributed by leading experts, the content is organized into six thematic sections: technologies, communication, mobility, energy flow, joint operations, and electromagnetic radiation awareness. It will be valuable for researchers, engineers, educators, and students, and it may also be used as a supplement to academic courses on algorithmic applications, wireless protocols, distributed computing, and networking.

Advances in Interdisciplinary Engineering - Niraj Kumar
2021-04-12

This book comprises the select proceedings of the International Conference on Future Learning Aspects of Mechanical Engineering (FLAME) 2020. This volume focuses on several emerging interdisciplinary areas involving mechanical

engineering. Some of the topics covered include automobile engineering, mechatronics, applied mechanics, structural mechanics, hydraulic mechanics, human vibration, biomechanics, biomedical Instrumentation, ergonomics, biodynamic modeling, nuclear engineering, and agriculture engineering. The contents of this book will be useful for students, researchers as well as professionals interested in interdisciplinary topics of mechanical engineering.

Modelling of Wireless Power Transfer - Ben Minnaert
2021-03-05

Wireless power transfer allows the transfer of energy from a transmitter to a receiver across an air gap, without any electrical connections.

Technically, any device that needs power can become an application for wireless power transmission. The current list of applications is therefore very diverse, from low-power portable electronics and household devices to high-power industrial automation and electric vehicles. With the

rise of IoT sensor networks and Industry 4.0, the presence of wireless energy transfer will only increase. In order to improve the current state of the art, models are being developed and tested experimentally. Such models allow simulating, quantifying, predicting, or visualizing certain aspects of the power transfer from transmitter(s) to receiver(s). Moreover, they often result in a better understanding of the fundamentals of the wireless link. This book presents a wonderful collection of peer-reviewed papers that focus on the modelling of wireless power transmission. It covers both inductive and capacitive wireless coupling and includes work on multiple transmitters and/or receivers.

Wireless Power Transfer - Johnson I. Agbinya 2015-12-01
Wireless Power Transfer is the second edition of a well received first book, which published in 2012. It represents the state-of-the-art at the time of writing, and addresses a unique subject of

great international interest in terms of research. Most of the chapters are contributed by the main author, though as in the first edition several chapters are contributed by other authors. The authors of the various chapters are experts in their own right on the specific topics within wireless energy transfer. Compared to the first edition, this new edition is more comprehensive in terms of the concepts discussed, and the range of current industrial applications which are presented, such as those of magnetic induction. From the eleven chapters of the first edition, this second edition has expanded to twenty chapters. More chapters on the theoretical foundations and applications have been included. This new edition also contains chapters which deal with techniques for reducing power losses in wireless power transfer systems. In this regard, specific chapters discuss impedance matching methods, frequency splitting and how to deploy systems based on frequency splitting. A

new chapter on multi-dimensional wireless power transfer has also been added. The design of wireless power transfer systems based on bandpass filtering approach has been included, in addition to the two techniques using couple mode theory and electronic circuits. The book has retained chapters on how to increase efficiency of power conversion and induction, and also how to control the power systems. Furthermore, detailed techniques for power relay, including applications, which were also discussed in the first edition, have been updated and kept. The book is written in a progressive manner, with a knowledge of the first chapters making it easier to understand the later chapters. Most of the underlying theories covered in the book are clearly relevant to inductive near field communications, robotic control, robotic propulsion techniques, induction heating and cooking and a range of mechatronic systems.

Intelligent Data Analytics for Power and Energy Systems -

Hasmat Malik 2022

This book brings together state-of-the-art advances in intelligent data analytics as driver of the future evolution of PaE systems. In the modern power and energy (PaE) domain, the increasing penetration of renewable energy sources (RES) and the consequent empowerment of consumers as a central and active solution to deal with the generation and development variability are driving the PaE system towards a historic paradigm shift. The small-scale, diversity, and especially the number of new players involved in the PaE system potentiate a significant growth of generated data. Moreover, advances in communication (between IoT devices and M2M: machine to machine, man to machine, etc.) and digitalization hugely increased the volume of data that results from PaE components, installations, and systems operation. This data is becoming more and more important for PaE systems operation, maintenance,

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planning, and scheduling with relevant impact on all involved entities, from producers, consumers and aggregators to market and system operators. However, although the PaE community is fully aware of the intrinsic value of those data, the methods to deal with it still necessitate substantial enhancements, development and research. Intelligent data analytics is thereby playing a fundamental role in this domain, by enabling stakeholders to expand their decision-making method and achieve the awareness on the PaE environment. The editors also included demonstrated codes for presented problems for better understanding for beginners.

Wireless Power Transfer -

Eugen Coca 2016-06-29
Wireless power transfer techniques have been gaining researchers' and industry attention due to the increasing number of battery-powered devices, such as mobile computers, mobile phones, smart devices, intelligent sensors, mainly as a way to

replace the standard cable charging, but also for powering battery-less equipment. The storage capacity of batteries is an extremely important element of how a device can be used. If we talk about battery-powered electronic equipment, the autonomy is one factor that may be essential in choosing a device or another, making the solution of remote powering very attractive. A distinction has to be made between the two forms of wireless power transmission, as seen in terms of how the transmitted energy is used at the receiving point: -

- Transmission of information or data, when it is essential for an amount of energy to reach the receiver to restore the transmitted information; -
- Transmission of electric energy in the form of electromagnetic field, when the energy transfer efficiency is essential, the power being used to energize the receiving equipment. The second form of energy transfer is the subject of this book.

[The Wireless World and Radio Review - 1926](#)

Digital Technologies and Applications - Saad Motahhir
2021-06-26

This book gathers selected research papers presented at the First International Conference on Digital Technologies and Applications (ICDTA 21), held at Sidi Mohamed Ben Abdellah University, Fez, Morocco, on 29–30 January 2021. highlighting the latest innovations in digital technologies as: artificial intelligence, Internet of things, embedded systems, network technology, information processing, and their applications in several areas such as hybrid vehicles, renewable energy, robotic, and COVID-19. The respective papers encourage and inspire researchers, industry professionals, and policymakers to put these methods into practice.

Energy Storage Systems and Power Conversion Electronics for E-Transportation and Smart Grid - Sergio Saponara
2020-12-02

This is a reprint in book form of

the Energies MDPI Journal Special Issue , entitled “Energy Storage Systems and Power Conversion Electronics for E-Transportation and Smart Grid”. The Special Issue was managed by two Guest Editors from Italy and Norway: Professor Sergio Saponara from the University of Pisa and Professor Lucian MIHET-POPA from Østfold University College, in close cooperation with the Editors from Energies. The papers published in this SI are related to the emerging trends in energy storage and power conversion electronic circuits and systems, with a specific focus on transportation electrification, and on the evolution from the electric grid to a smart grid. An extensive exploitation of renewable energy sources is foreseen for the smart grid, as well as a close integration with the energy storage and recharging systems of the electrified transportation era. Innovations at the levels of both algorithmic and hardware (i.e., power converters, electric drives, electronic control units

(ECU), energy storage modules and charging stations) are proposed. Research and technology transfer activities in energy storage systems, such as batteries and super/ultra-capacitors, are essential for the success of electric transportation, and to foster the use of renewable energy sources. Energy storage systems are the key technology to solve these issues, and to increase the adoption of renewable energy sources in the smart grid.

Elements of Radio Frequency Energy Harvesting and Wireless Power Transfer Systems -

Taimoor Khan 2020-11-12

This book focuses on elementary concepts of both radio frequency energy harvesting (RFEH) and wireless power transfer (WPT), and highlights their fundamental requirements followed by recent advancements. It provides a systematic overview of the key components required for RFEH and WPT applications and also comprehensively introduces

the pioneering research advancements achieved to date. The state-of-the-art circuit design topologies for the two different applications are presented mainly in terms of antenna operating frequencies, polarization characteristics, efficient matching network circuits, rectifier topologies, and overall rectenna systems. The book serves as a single point of reference for practicing engineers and researchers searching for potential sources and elements involved in the RFEH system as well as in the WPT system, and need rapid training and design guidelines in the following areas: • Different sensing elements used in RFEH and WPT • Inclusions of mathematical expressions and design problems • Illustration of some design examples and performance enhancement techniques

Mysteries of Radiance Unfolded - Gyeorgos C. Hatonn 1993-08

Emerging Capabilities and

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Applications of Wireless Power Transfer - Triviño-Cabrera, Alicia 2018-09-21

Technologies that enable powering a device without the need for being connected with a cable to the grid are gaining attention in recent years due to the advantages that they provide. They are a commodity to users and provide additional functionalities that promote autonomy among the devices. Emerging Capabilities and Applications of Wireless Power Transfer is an essential reference source that analyzes the different applications of wireless power transfer technologies and how the technologies are adapted to fulfill the electrical, magnetic, and design-based requirements of different applications. Featuring research on topics such as transfer technologies, circuit analysis, and inductive power transfer, this book is a vital resource for academicians, electrical engineers, scientists, researchers, and industry professionals seeking coverage on device power and creating

autonomy through alternative power options for devices.

Cloud Computing Enabled Big-Data Analytics in Wireless Ad-hoc Networks - Sanjoy Das 2022-03-21

This book discusses intelligent computing through the Internet of Things (IoT) and Big-Data in vehicular environments in a single volume. It covers important topics, such as topology-based routing protocols, heterogeneous wireless networks, security risks, software-defined vehicular ad-hoc networks, vehicular delay tolerant networks, and energy harvesting for WSNs using rectenna. FEATURES Covers applications of IoT in Vehicular Ad-hoc Networks (VANETs) Discusses use of machine learning and other computing techniques for enhancing performance of networks Explains game theory-based vertical handoffs in heterogeneous wireless networks Examines monitoring and surveillance of vehicles through the vehicular sensor network Investigates

theoretical approaches on software-defined VANET The book is aimed at graduate students and academic researchers in the fields of electrical engineering, electronics and communication engineering, computer science, and engineering.

Optical Neural Interfaces - Massimo De Vittorio
2019-11-01

Wireless Power Transfer and Data Communication for Neural Implants - Gürkan Yilmaz
2017-01-01

This book presents new circuits and systems for implantable biomedical applications targeting neural recording. The authors describe a system design adapted to conform to the requirements of an epilepsy monitoring system. Throughout the book, these requirements are reflected in terms of implant size, power consumption, and data rate. In addition to theoretical background which explains the relevant technical challenges, the authors provide practical, step-by-step solutions to these

problems. Readers will gain understanding of the numerical values in such a system, enabling projections for feasibility of new projects.

Sustainability and Health in Intelligent Buildings - Riadh Habash
2022-04-08

Sustainability and Health in Intelligent Buildings presents a comprehensive roadmap for designing and constructing high-performance clean energy-efficient buildings, including intelligence capabilities underpinned by smart power, 5G and Internet-of-Things technologies, environmental sensors, intelligent control strategies and cyber-physical security. This book includes a special emphasis on health pandemic resiliency that discusses strong engineering control strategies to respond and recover from infectious diseases like COVID-19. Sections cover the foundational aspects of healthy buildings, with a special emphasis on assessing indoor environmental qualities. In addition, it introduces the necessary principles that assist

engineers and researchers in understanding and designing buildings that meet health and sustainability goals. Describes the basic elements of building a digital ecosystem, along with informatics-driven performance architecture Features various models used in the design of controllers for major systems such as HVAC and lighting Explores the notion of building bioelectromagnetics to ensure health and safety from human exposure to EM fields

Wireless Power Transfer for Electric Vehicles: Foundations and Design Approach - Alicia Triviño-Cabrera 2019-09-19

This book describes the fundamentals and applications of wireless power transfer (WPT) in electric vehicles (EVs). Wireless power transfer (WPT) is a technology that allows devices to be powered without having to be connected to the electrical grid by a cable. Electric vehicles can greatly benefit from WPT, as it does away with the need for users to manually recharge the vehicles' batteries, leading to safer charging operations.

Some wireless chargers are available already, and research is underway to develop even more efficient and practical chargers for EVs. This book brings readers up to date on the state-of-the-art worldwide. In particular, it provides:

- The fundamental principles of WPT for the wireless charging of electric vehicles (car, bicycles and drones), including compensation topologies, bi-directionality and coil topologies.
- Information on international standards for EV wireless charging.
- Design procedures for EV wireless chargers, including software files to help readers test their own designs.
- Guidelines on the components and materials for EV wireless chargers.
- Review and analysis of the main control algorithms applied to EV wireless chargers.
- Review and analysis of commercial EV wireless charger products coming to the market and the main research projects on this topic being carried out worldwide. The book provides essential practical guidance on

how to design wireless chargers for electric vehicles, and supplies MATLAB files that demonstrate the complexities of WPT technology, and which can help readers design their own chargers.

Applications in Electronics Pervading Industry, Environment and Society—Industrial Electronics and Cyber Physical Systems -

Sergio Saponara 2021-09-02

This book features the manuscripts accepted for the Special Issue “Applications in Electronics Pervading Industry, Environment and Society—Sensing Systems and Pervasive Intelligence” of the MDPI journal *Sensors*. Most of the papers come from a selection of the best papers of the 2019 edition of the “Applications in Electronics Pervading Industry, Environment and Society” (APPLEPIES) Conference, which was held in November 2019. All these papers have been significantly enhanced with novel experimental results. The papers give an overview of the trends in

research and development activities concerning the pervasive application of electronics in industry, the environment, and society. The focus of these papers is on cyber physical systems (CPS), with research proposals for new sensor acquisition and ADC (analog to digital converter) methods, high-speed communication systems, cybersecurity, big data management, and data processing including emerging machine learning techniques. Physical implementation aspects are discussed as well as the trade-off found between functional performance and hardware/system costs.

Wireless Power Transfer -

Mohamed Zellagui 2021-08-18

Wireless power transfer (WPT) is a promising technology used to transfer electric energy from a transmitter to a receiver wirelessly without wires through various methods and technologies using time-varying electric, magnetic, or electromagnetic fields. It is an attractive solution for many industrial applications due to

its many benefits over wired connections. This book discusses the theory and practical aspects of WPT technology.

Wireless Power Transfer for Electric Vehicles and Mobile Devices - Chun T. Rim
2017-08-07

From mobile, cable-free re-charging of electric vehicles, smart phones and laptops to collecting solar electricity from orbiting solar farms, wireless power transfer (WPT) technologies offer consumers and society enormous benefits. Written by innovators in the field, this comprehensive resource explains the fundamental principles and latest advances in WPT and illustrates key applications of this emergent technology. Key features and coverage include: The fundamental principles of WPT to practical applications on dynamic charging and static charging of EVs and smartphones. Theories for inductive power transfer (IPT) such as the coupled inductor model, gyrator circuit model, and magnetic mirror model.

IPTs for road powered EVs, including controller, compensation circuit, electro-magnetic field cancel, large tolerance, power rail segmentation, and foreign object detection. IPTs for static charging for EVs and large tolerance and capacitive charging issues, as well as IPT mobile applications such as free space omnidirectional IPT by dipole coils and 2D IPT for robots. Principle and applications of capacitive power transfer. Synthesized magnetic field focusing, wireless nuclear instrumentation, and future WPT. A technical asset for engineers in the power electronics, internet of things and automotive sectors, Wireless Power Transfer for Electric Vehicles and Mobile Devices is an essential design and analysis guide and an important reference for graduate and higher undergraduate students preparing for careers in these industries.

Compact Size Wireless Power Transfer Using

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Defected Ground Structures

- Sherif Hekal 2019-05-29

This book addresses the design challenges in near-field wireless power transfer (WPT) systems, such as high efficiency, compact size, and long transmission range. It presents new low-profile designs for the TX/RX structures using different shapes of defected ground structures (DGS) like (H, semi-H, and spiral-strips DGS). Most near-field WPT systems depend on magnetic resonant coupling (MRC) using 3-D wire loops or helical antennas, which are often bulky. This, in turn, poses technical difficulties in their application in small electronic

devices and biomedical implants. To obtain compact structures, printed spiral coils (PSCs) have recently emerged as a candidate for low-profile WPT systems. However, most of the MRC WPT systems that use PSCs have limitations in the maximum achievable efficiency due to the feeding method. Inductive feeding constrains the geometric dimensions of the main transmitting (TX)/receiving (RX) resonators, which do not achieve the maximum achievable unloaded quality factor. This book will be of interest to researchers and professionals working on WPT-related problems.

Pacific Marine Review - 1914