Electric Vehicle Systems Architecture And Standardization Needs Reports Of The Pp European Green Vehicles Initiative Lecture Notes In Lity

Modern Electric Vehicle Technology

This book surveys state-of-the-art research on and developments in lithium-ion batteries for hybrid and electric vehicles. It summarizes their features in terms of performance, cost, service life, management, charging facilities, and safety. Vehicle electrification is now commonly accepted as a means of reducing fossil-fuels consumption and air pollution. At present, every electric vehicle on the road is powered by a lithium-ion battery. Currently, batteries based on lithium-ion technology are ranked first in terms of performance, reliability and safety. Though other systems, e.g., metal-air, lithium-sulphur, solid state, and aluminium-ion, are now being investigated, the lithium-ion system is likely to dominate for at least the next decade - which is why several manufacturers, e.g., Toyota, Nissan and Tesla, are chiefly focusing on this technology. Providing comprehensive information on lithium-ion batteries, the book includes contributions by the world’s leading experts on Li-ion batteries and vehicles.

Energy Management Strategies for Electric and Plug-in Hybrid Electric Vehicles

This book addresses the practical issues for commercialization of current and future electric and plug-in hybrid electric vehicles (EVs/PHEVs). The volume focuses on power electronics and motor drives based solutions for both current as well as future EV/PHEV technologies. Propulsion system requirements and motor sizing for EVs is also discussed, along with practical system sizing examples. PHEV power system architectures are discussed in detail. Key EV battery technologies are explained as well as corresponding battery management issues are summarized. A advanced power electronic converter topologies for current and future charging infrastructures will also be discussed in detail. EV/PHEV interface with renewable energy is discussed in detail, with practical examples.

Hybrid Electric Vehicles

"If only more new media commentators had this level of historical-critical reference, engaging, good stories, and a degree of wonder at what media and windows bring to the city, to life." - John Hutnyk, Goldsmiths, University of London "Just when you thought the last word had been said about cities and media, along comes Scott McQuire to breathe new life into the debate. When revisiting existing pathways, his always ingenious eyes produce startling and original insights. When striking out into new territory, he opens up before us new vistas. I love this book." - James Donald, University of New South Wales "A book that crams into a single chapter more insights and illustrations than seems feasible, yet which ties all threads together through a consistent, theoretically rich analysis of the interplay of media and city Writing with effectiveness and understanding of the back-cover blurbs on academic tomes, James Donald says 'I love this book'. But I will end by echoing his praise, and make a promise to readers: you will love The Media City, too." - European Journal of Communication "Refreshing clear, getting to grips with some of the key concepts of urban sociology in a way that moves beyond the wistful evocation and splatter of undigested themes that characterises so much academic writing on culture and cities." - Media, Culture & Society Significant changes are occurring in the spaces and rhythms of contemporary cities and in the social functioning of media. This forceful book argues that the redefinition of urban space by mobile, instantaneous and pervasive media is producing a distinctive mode of social experience. Media are no longer separate from the city. Instead the proliferation of spatialized media platforms has produced a media-architecture complex - the media city. Offering critical and historical analysis at the deepest levels, The Media City links the formation of the modern city to the development of modern image technologies and outlines a new genealogy for assessing contemporary developments such as digital networks and digital architecture, webcams and public screens, surveillance society and reality television. Wide-ranging and thoughtfully illustrated, it intersects disciplines and connects phenomena which are too often left isolated from each other to propose a new way of understanding public and private space and social life in contemporary cities. It will find a broad readership in media and communications, cultural studies, social theory, urban sociology, architecture and art history. Winner of the 2009 Jane Jacobs Urban Communication Award.

Technologies and Applications for Smart Charging of Electric and Plug-in Hybrid Electric Vehicles

The latest developments in the field of hybrid electric vehicles Hybrid Electric Vehicles provides an introduction to hybrid vehicles, which include purely electric, hybrid...
Green Vehicles Initiative Lecture Notes In Library Electric Vehicle Systems Architecture And Standardization Needs Reports Of The Ppp European Technology and State University lead NSF Center for Power Electronic Systems (CPES). He remains active on the MIT-Industry Consortium on Advanced Automotive Electrical and several high visibility initiatives, including the US Department of Energy's partnership for a new generation of vehicle (PNGV) initiative and the Virginia Institute of Ford Motor Company research laboratories. He was technical project leader of Ford's 42V Integrated Starter Generator (ISG) product development program, and represented Ford on development, modelling, simulation and testing. It will also be of interest to postgraduate students in the field. About the Author: Dr. John M. Miller is founder of J-N-J Design systems and modelling, and supporting electrical systems, this book will be an invaluable resource for practicing engineers and managers involved in all aspects of hybrid vehicle electric traction system sizing and design, loss mechanisms, system simulation and vehicle certification. Offering in-depth coverage of hybrid propulsion topics, energy storage to supporting chassis subsystems necessary for realizing hybrid modes of operation. Key topics covered include hybrid propulsion system architectures, propulsion system sizing, electric traction system sizing and design, loss mechanisms, system simulation and vehicle certification. Offering in-depth coverage of hybrid propulsion system architectures, energy storage systems and modelling, and supporting electrical systems, this book will be an invaluable resource for practicing engineers and managers involved in all aspects of hybrid vehicle development, modelling, simulation and testing. It will also be of interest to postgraduate students in the field. About the Author: Dr. John M. Miller is founder of J-N-J Design Services P.L.C., where he serves as principal engineer. Dr. Miller worked for 20 years on electric and hybrid vehicle programs and vehicle electrical system simulation at the Ford Motor Company research laboratories. He was technical project leader of Ford's 42V Integrated Starter Generator (ISG) product development program, and represented Ford on several high visibility initiatives, including the US Department of Energy's partnership for a new generation of vehicle (PNGV) initiative.莲花 Dryitsuo traces the spectacular rise and spread of citrus across the globe, from southeast Asia in 4000 BC to modern Spain and Portugal, whose explorers introduced the fruit to the Americas. This book explores the numerous roles that citrus has played in agriculture, horticulture, cooking, nutrition, religion, and art.

Electric Vehicles in Energy Systems

Lazslo traces the spectacular rise and spread of citrus across the globe, from southeast Asia in 4000 BC to modern Spain and Portugal, whose explorers introduced the fruit to the Americas. This book explores the numerous roles that citrus has played in agriculture, horticulture, cooking, nutrition, religion, and art.

Propulsion Systems for Hybrid Vehicles

This contributed volume collects insights from industry professionals, policy makers and researchers on new and profitable business models in the field of electric vehicles (EV) for the mass market. This book includes approaches that address the optimization of total cost of ownership. Moreover, it presents alternative models of ownership, financing and leasing. The editors present state-of-the-art insights from international experts. The volume has been edited in the framework of the International Energy Agency's Implementing Agreement for Cooperation on Hybrid and Electric Vehicles (IA-HEV). The target audience primarily comprises practitioners and decision makers but the book may also be beneficial for research experts and graduate students.

The Media City

This book systematically introduces readers to the core algorithms of battery management system (BMS) for electric vehicles. These algorithms cover most of the technical bottlenecks encountered in BMS applications, including battery system modeling, state of charge (SOC) and state of health (SOH) estimation, state of power (SOP) estimation, remaining useful life (RUL) prediction, heating at low temperature, and optimization of charging. The book not only presents these algorithms, but also discusses their background, as well as related experimental and hardware developments. The concise figures and program codes provided make the calculation process easy to follow and apply, while the results obtained are presented in a comparative way, allowing readers to intuitively grasp the characteristics of different algorithms. Given its scope, the book is intended for researchers, senior undergraduate and graduate students, as well as engineers in the fields of electric vehicles and energy storage.

Vehicular Electric Power Systems

This edited volume presents research results of the PPP European Green Vehicle Initiative (EGVI), focusing on Electric Vehicle Systems Architecture and Standardization Needs. The objectives of energy efficiency and zero emissions in road transportation imply a paradigm shift in the concept of the automobile regarding design, materials, and propulsion technology. A redesign of the electric and electronic architecture provides in many aspects additional potential for reaching these goals. At the same time, standardization within a broad range of features, components and systems is a key enabling factor for a successful market entry of the electric vehicle (EV). It would lower production cost, increase interoperability and compatibility, and sustain market penetration. Hence, novel architectures and testing concepts and standardization approaches for the EV have been the topic of an expert workshop of the European Green Vehicles Initiative PPP. This book contains the contributions of current European research projects on EV architecture and an expert view on the status of EV standardization. The target audience primarily comprises researchers and experts in the field.

2015 9th International Conference on Power Electronics and ECCE Asia (ICPE-ECCE Asia 2015)

The automotive industry is waking up to the fact that hybrid electric vehicles could provide an answer to the ever-increasing need for lower-polluting and more fuel-efficient forms of personal transport. This is the first book to give comprehensive coverage of all aspects of the hybrid vehicle design, from its power plant and energy storage systems, to supporting chassis subsystems necessary for realizing hybrid modes of operation. Key topics covered include hybrid propulsion system architectures, propulsion system sizing, electric traction system sizing and design, loss mechanisms, system simulation and vehicle certification. Offering in-depth coverage of hybrid propulsion system architectures, energy storage systems and modelling, and supporting electrical systems, this book will be an invaluable resource for practicing engineers and managers involved in all aspects of hybrid vehicle development, modelling, simulation and testing. It will also be of interest to postgraduate students in the field. About the Author: Dr. John M. Miller is founder of J-N-J Design Services P.L.C., where he serves as principal engineer. Dr. Miller worked for 20 years on electric and hybrid vehicle programs and vehicle electrical system simulation at the Ford Motor Company research laboratories. He was technical project leader of Ford's 42V Integrated Starter Generator (ISG) product development program, and represented Ford on several high visibility initiatives, including the US Department of Energy's partnership for a new generation of vehicle (PNGV) initiative and the Virginia Institute of Technology and State University lead NSF Center for Power Electronic Systems (CPES). He remains active on the MIT-Industry Consortium on Advanced Automotive Electrical and Electronic Components, and is an adjunct professor at Michigan State University, where he has taught a graduate-level course in electrical machines and drives, and at Texas A&M
Electric Vehicle Batteries: Moving from Research towards Innovation

Electric and Hybrid Vehicles: Power Sources, Models, Sustainability, Infrastructure and the Market reviews the performance, cost, safety, and sustainability of battery systems for hybrid electric vehicles (HEVs) and electric vehicles (EVs), including nickel-metal hydride batteries and Li-ion batteries. Throughout this book, especially in the first chapters, alternative vehicles with different power trains are compared in terms of lifetime cost, fuel consumption, and environmental impact. The emissions of greenhouse gases are particularly dealt with. The improvement of the battery, or fuel cell, performance and governmental incentives will play a fundamental role in determining how far and how fast substantial alternative vehicles will penetrate into the market. An adequate recharging infrastructure is of paramount importance for the diffusion of vehicles powered by batteries and fuel cells, as it may contribute to overcome the so-called range anxiety."** Thus, proposed battery charging techniques are summarized and hydrogen refueling stations are described. The final chapter reviews the state of the art and the current models of hybrid and electric vehicles along with the powertrain solutions adopted by the major automakers. Contributions from the worlds leading industry and research experts Executive summaries of specific case studies Information on basic research and application approaches

Hybrid Electric Vehicles

Urban Systems Design

Modern Hybrid Electric Vehicles provides vital guidance to help a new generation of engineers master the principles of and further advance hybrid vehicle technology. The authors address purely electric, hybrid electric, plug-in hybrid electric, hybrid hydraulic, fuel cell, and off-road hybrid vehicle systems. They focus on the power and propulsion systems for these vehicles, including issues related to power and energy management. They concentrate on material that is not readily available in other hybrid electric vehicle (HEV) books such as design examples for hybrid vehicles, and cover new developments in the field including electronic CVT, plug-in hybrid, and new power converters and controls. Covers hybrid vs. pure electric, HEV system architecture (including plug-in and hydraulic), off-road and other industrial utility vehicles, non-ground-vehicle applications like ships, locomotives, aircrafts, system reliability, EMC, storage technologies, vehicular power and energy management, diagnostics and prognostics, and electromechanical vibration issues. Contains core fundamentals and principles of modern hybrid vehicles at component level and system level. Provides graduate students and field engineers with a text suitable for classroom teaching or self-study.

Vehicle Propulsion Systems

A comprehensive and up-to-date reference book on modern electric vehicle technology, which covers the engineering philosophy, state-of-the-art technology, and commercialisation of electrical vehicles.

Modern Electric, Hybrid Electric, and Fuel Cell Vehicles, Third Edition

The why, what and how of the electric vehicle powertrain Empowers engineering professionals and students with the knowledge and skills required to engineer electric vehicle powertrain architectures, energy storage systems, power electronics converters and electric drives. The modern electric powertrain is relatively new for the automotive industry, and engineers are challenged with designing affordable, efficient and high-performance electric powertrains as the industry undergoes a technological evolution. Co-authored by two electric vehicle (EV) engineers with decades of experience designing and putting into production all of the powertrain technologies presented, this book provides readers with the hands-on knowledge, skills and expertise they need to rise to that challenge. This four-part practical guide provides a comprehensive review of battery, hybrid and fuel cell EV systems and the associated energy sources, power electronics, machines, and drives. The first part of the book begins with a historical overview of electromobility and the related environmental impacts motivating the development of the electric powertrain. Vehicular requirements for electromechanical propulsion are then presented. Battery electric vehicles (BEV), fuel cell electric vehicles (FCEV), and conventional and hybrid electric vehicles (HEV) are then described, contrasted and compared for vehicle propulsion. The second part of the book features in-depth analysis of the electric powertrain traction machines, with a particular focus on the induction machine and the surface- and interior-permanent magnet ac machines. The brushed dc machine is also considered due to its ease of operation and understanding, and its historical place, especially as the traction machine on NASA’s Mars rovers. The third part of the book features the theory and applications for the propulsion, charging, accessory, and auxiliary power electronics converters. Chapters are presented on isolated and non-isolated dc-dc converters, traction inverters, and battery charging. The fourth part presents the introductory and applied electromagnetics required as a foundation throughout the book. • Introduces and holistically integrates the key EV powertrain technologies. • Provides a comprehensive overview of existing and emerging automotive solutions. • Provides experience-based expertise for vehicular and powertrain system and sub-system level study, design, and optimization.
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Prepared by Yevgeniy Osadchuk, PhD, PEng

This book discusses the technical, economic, and environmental aspects of electric vehicles and their impact on electrical grids and energy systems. The book is divided into three parts that include load modeling, integration and optimization, and environmental evaluation. Theoretical background and practical examples accompany each section and the authors include helpful tips and hints in the load modeling and optimization sections. This book is intended to be a useful tool for undergraduate and graduate students, researchers, and engineers who are trying to solve power and engineering problems related to electric vehicles. Provides optimization techniques and their applications for energy systems; Discusses the economic and environmental perspectives of electric vehicles; Contains the most comprehensive information about electric vehicles in a single source.

Machines Chapter 10: Interior-permanent-magnet AC Machines Part III Power Electronics Chapter 11 DC-DC Converters Chapter 12 Isolated DC-DC Converters Chapter 13 Traction Drives and Three-phase Inverters Chapter 14 Battery Charging Chapter 15 Control of the Electric Drive Part IV Basics Chapter 16 Introduction to Electromagnetism, Ferromagnetism, and Electromechanical Energy Conversion The first third of the book (Chapters 1 to 6), plus parts of Chapters 14 and 16, can be taught to the general science or engineering student in the second or third year. It covers the introductory automotive material using basic concepts from mechanical, electrical, environmental, and electrochemical engineering. Chapter 14 on electrical charging and Chapter 16 on electromagnetism can also be used as a general introduction to electrical engineering. The basics of electromagnetism, ferromagnetism and electromechanical energy conversion (Chapter 16) and dc machines (Chapter 7) can be taught to second year (sophomore) engineering students who have completed introductory electrical circuits and physics. The third year (junior) students typically have a core circuit analysis, and so they can cover ac machines, such as the induction machine (Chapter 8) and the surface permanent-magnet ac machine (Chapter 9). As the students typically have studied control theory, they can investigate the control of the speed and torque loops of the motor drive (Chapter 15). Power electronics, featuring non-isolated buck and boost converters (Chapter 11), can also be introduced in the third year. The final-year (senior) students can then go on to cover the more advanced technologies of the interior-permanent-magnet ac machine (Chapter 10). Isolated power converters (Chapter 12), such as the full-bridge and resonant converters, inverters (Chapter 13), and power-factor-corrected battery chargers (Chapter 14), are covered in the power electronics section. This material can also be covered at the introductory postgraduate level. Various homework, simulation, and research exercises are presented throughout the textbook. The reader is encouraged to attempt these exercises as part of the learning experience. Instructors are encouraged to contact the author, John Hayes, to discuss course content or structure.

Batteries Management Systems for Large Lithium-Ion Battery Packs

This timely book provides you with a solid understanding of battery management systems (BMS) in large Li-ion battery packs, describing the important technical challenges in this field and exploring the most effective solutions. You find in-depth discussions on BMS topologies, functions, and complexities, helping you determine which permutation is right for your application. Packed with numerous graphics, tables, and images, the book explains the DC whyDCO and DC howDCO of Li-ion BMS design, installation, configuration and troubleshooting. This hands-on resource includes an unbiased description and comparison of all the off-the-shelf Li-ion BMSs available today. Moreover, it explains how using the correct one for a given application can help to get a Li-ion pack up and running in little time at low cost.*

Vehicles Powered by the Electric Grid

This book reports on the state of the art in the field of multiphysics systems. It consists of accurately reviewed contributions to the M M SSD’ 2014 conference, which was held from December 17 to 19, 2004 in Hammamet, Tunisia. The different chapters, covering new theories, methods and a number of case studies, provide readers with an up-to-date picture of multiphysics modeling and simulation. They highlight the role played by high-performance computing and newly available software in promoting the study of multiphysics coupling effects, and show how these technologies can be practically implemented to bring about significant improvements in the field of design, control and monitoring of machines. In addition to providing a detailed description of the methods and their applications, the book also identifies new research issues, challenges and opportunities, thus providing researchers and practitioners with both technical information to support their daily work and a new source of inspiration for their future research.

Electric Vehicle Integration into Modern Power Networks

* Re-inventing the Automobile

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Electric Vehicle Integration into Modern Power Networks
Vehicles are intrinsically linked to our lives. This book covers all technical details of the vehicle electrification process, with focus on power electronics. The main challenge in vehicle electrification consists of replacing the engine-based mechanical, pneumatic, or hydraulic ancillary energy sources with electrical energy processed through an electromagnetic device. The book illustrates this evolutionary process with numerous series-production examples for either of body or chassis systems, from milestones to futuristic luxury vehicles. Electrification of ancillaries and electric propulsion eventually meet into an all-electric vehicle and both processes rely heavily on power electronics. Power electronics deals with electronic processing of electrical energy. This makes it a support technology for the automotive industry. All the automotive visions for the next decade (2020-2030) are built on top of power electronics and the automotive power electronics industry is expected at 15% compound annual growth rate, the highest among all automotive technologies. Hence, automotive power electronics industry is very appealing for recent and future graduates. The book structure follows the architecture of the electrical power system for a conventional engine-based vehicle, with a last chapter dedicated to an introduction onto electric propulsion. The first part of the book describes automotive technologies for generation and distribution of electrical power, as well as its usage within body systems, chassis systems, or lighting. The second part explores deeper into the specifics of each component of the vehicle electric power system. Since cars have been on the streets for over 100 years, each chapter starts with a list of historical achievements. Recognizing the engineering effort span over more than a century enrobes the R & D efforts of the new millennium. Focus on history of electricity in vehicle applications is another attractive treat of the book. The book fills a gap between books targeting practical education and works bringing advanced academic vision, offering students and academics a quick tour of the basic tools and long-standing infrastructure, and offering practicing engineers an introduction on newly introduced power electronics-based technologies. It is therefore recommended as a must-have book for students and early graduates in automotive power electronics activities.

**Automotive Power Systems**

Vehicular Electric Power Systems: Land, Sea, Air, and Space Vehicles acquaints professionals with trends and challenges in the development of more electric vehicles (MEVs) using detailed examples and comprehensive discussions of advanced MEV power system architectures, characteristics, and dynamics. The authors focus on real-world applications and highlight issues related to system stability as well as challenges faced during and after implementation. Probes innovations in the development of more electric vehicles for improved maintenance, support, endurance, safety, and cost-efficiency in automobiles and marine vehicle engineering. Herding a new wave of advances in power system technology, Vehicular Electric Power Systems discusses: different automotive power systems including conventional automobiles, more electric cars, heavy-duty vehicles, and electric and hybrid electric vehicles; Electric and hybrid electric propulsion systems and control strategies; Aerospace power systems including conventional and advanced aircraft, spacecraft, and the international space station; and undersea vehicles. The modeling, real-time state estimation, and stability assessment of vehicular power systems; Applications of fuel cells in various land, sea, air, and space vehicles; Modeling techniques for energy storage devices including batteries, fuel cells, photovoltaic cells, and ultracapacitors; Advanced power electronic converters and electric motor drives for vehicular applications; Guidelines for the proper design of DC and AC distribution architectures.

**An Automotive Electrical and Electronic Systems**

Urban Systems Design: Creating Sustainable Smart Cities in the Internet of Things Era shows how to design, model and monitor smart communities using a distinctive IoT-based urban systems approach. Focusing on the essential dimensions that constitute smart communities energy, transport, urban form, and human comfort, this helpful guide explores how IoT-based sharing platforms can achieve greater community health and well-being based on relationship building, trust, and resilience. Uncovering the achievements of the most recent research on the potential of IoT and big data, this book shows how to identify, structure, measure and monitor multi-dimensional urban sustainability standards and progress. This thorough book demonstrates how to select a project, which technologies are most cost-effective, and their cost-benefit considerations. The book also illustrates the financial, institutional, policy, and technological needs for the successful transition to smart cities, and concludes by discussing both the conventional and innovative regulatory instruments needed for a fast and smooth transition to smart, sustainable communities. Provides operational case studies and best practices from cities throughout Europe, North America, Latin America, Asia, Australia, and Africa, providing instructive examples of the social, environmental, and economic aspects of "smartification" Reviews assessment and urban sustainability certification systems such as LEED, BREEAM, and CASBEE, examining how each addresses smart technologies criteria Examines existing technologies for efficient energy management, including HEMS, BEMS, energy harvesting, electric vehicles, smart grids, and more.

**Multiphysics Modelling and Simulation for Systems Design and Monitoring**

This book reflects the shift in design paradigm in automobile industry. It presents future innovations, often referred as “automotive systems engineering”. These cause fundamental innovations in the field of driver assistance systems and electromobility as well as fundamental changes in the architecture of the vehicles. New driving functionalities can only be realized if the software programs of multiple electronic control units work together correctly. This volume presents the new and innovative methods which are mandatory to master the complexity of the vehicle of the future.

**Advances in Battery Technologies for Electric Vehicles**

Electric Vehicle Integration into Modern Power Networks provides coverage of the challenges and opportunities posed by the progressive integration of electric drive vehicles. Starting with a thorough overview of the current electric vehicle and battery state-of-the-art, this work describes dynamic software tools to assess the impacts resulting from the electric vehicles deployment on the steady state and dynamic operation of electricity grids, identifies strategies to mitigate them and the possibility to support simultaneously large-scale integration of renewable energy sources. New business models and control management architectures, as well as the communication infrastructure required to integrate electric vehicles as active demand are presented. Finally, regulatory issues of integrating electric vehicles into modern power systems are addressed. Inspired by two courses held under the EES-UETP umbrella in 2010 and 2011, this contributed volume consists of nine chapters written by leading researchers and professionals from the industry as well as academia.
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Modeling, Dynamics, and Control of Electrified Vehicles

Advances in Battery Technologies for Electric Vehicles provides an in-depth look into the research being conducted on the development of more efficient batteries capable of long distance travel. The text contains an introductory section on the market for battery and hybrid electric vehicles, then thoroughly presents the latest on lithium-ion battery technology. Readers will find sections on battery pack design and management, a discussion of the infrastructure required for the creation of a battery powered transport network, and coverage of the issues involved with end-of-life management for these types of batteries. Provides an in-depth look into new research on the development of more efficient, long distance travel batteries. Contains an introductory section on the market for battery and hybrid electric vehicles. Discusses battery pack design and management and the issues involved with end-of-life management for these types of batteries.

Commercial Aircraft Propulsion and Energy Systems Research

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.

Electric Vehicle Technology Explained

This book is designed as an interdisciplinary platform for specialists working in electric and plug-in hybrid electric vehicles powertrain design and development, and for scientists who want to get access to information related to electric and hybrid vehicle energy management, efficiency and control. The book presents the methodology of simulation that allows the specialist to evaluate electric and hybrid vehicle powertrain energy flow, efficiency, range and consumption. The mathematics behind each electric and hybrid vehicle component is explained and for each specific vehicle the powertrain is analyzed and output results presented through the use of specific automotive industrial software that allows the specialist to evaluate electric and hybrid vehicle powertrain energy flow, efficiency, range and consumption. These vehicles can be adjusted, updated and predicted via development processes.

Automotive Systems Engineering

This edited volume presents research results of the PPP European Green Vehicle Initiative (EGVI), focusing on electric vehicle batteries. Electrification is one road towards sustainable road transportation, and battery technology is one of the key enabling technologies. However, at the same time, battery technology is one of the main obstacles for a broad commercial launch of electric vehicles. This book includes research contributions which try to bridge the gap between research and innovation in the field of battery technology for electric vehicles. The target audience primarily comprises researchers and experts in the field.

Battery Management Algorithm for Electric Vehicles

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.

Thermal Management of Electric Vehicle Battery Systems

The book deals with the fundamentals, theoretical bases, and design methodologies of conventional internal combustion engine (ICE) vehicles, electric vehicles (EVs), hybrid electric vehicles (HEVs), and fuel cell vehicles (FCVs). The design methodology is described in mathematical terms, step-by-step, and the topics are approached from the overall drive train system, not just individual components. Furthermore, in explaining the design methodology of each drive train, design examples are presented with simulation results.

Citrus

This book outlines issues related to massive integration of electric and plug-in hybrid electric vehicles into power grids. Electricity is becoming the preferred energy vector
for the next generation of road vehicles. It is widely acknowledged that road vehicles based on full electric or hybrid drives can mitigate problems related to fossil fuel dependence. This book explains the emerging and understanding of storage systems for electric and plug-in hybrid vehicles. The recharging stations for these types of vehicles might represent a great advantage for the electric grid by facilitating integration of renewable and distributed energy production. This book presents a broad review from analyzing current literature to on-going research projects about the new power technologies related to the various charging architectures for electric and plug-in hybrid vehicles. Specifically focusing on DC fast charging operations, as well as, grid-connected power converters and the full range of energy storage systems. These key components are analyzed for distributed generation and charging system integration into micro-grids. The authors demonstrate that these storage systems represent effective interfaces for the control and management of renewable and sustainable distributed energy resources. New standards and applications are emerging from micro-grid pilot projects around the world and case studies demonstrate the convenience and feasibility of distributed energy management. The material in this unique volume discusses potential avenues for further research toward achieving more reliable, more secure and cleaner energy.

A Summary of Electric Vehicle Propulsion Technologies

The automotive industry appears close to substantial change engendered by “self-driving” technologies. This technology offers the possibility of significant benefits to social welfare—saving lives; reducing crashes, congestion, fuel consumption, and pollution; increasing mobility for the disabled; and ultimately improving land use. This report is intended as a guide for state and federal policymakers on the many issues that this technology raises.

Electric Vehicle Systems Architecture and Standardization Needs

How to leave behind our unwieldy, gas-guzzling, carbon dioxide-emitting vehicles for cars that are green, smart, connected, and fun. This book provides a long-overdue vision for a new automobile era. The cars we drive today follow the same underlying design principles as the Model Ts of a hundred years ago and the tail-finned sedans of fifty years ago. In the twenty-first century, cars are still made for twentieth-century purposes. They are inefficient for providing personal mobility within cities—where most of the world’s people now live. In this pathbreaking book, William Mitchell and two industry experts reimagine the automobile, describing vehicles of the near future that are green, smart, connected, and fun to drive. They roll out four big ideas that will make this both feasible and timely. The fundamental reinvention of the automobile won’t be easy, but it is an urgent necessity—to make urban mobility more convenient and sustainable, to make cities more livable, and to help bring the automobile industry out of crisis.

New Trends in Electrical Vehicle Powertrains

This textbook will help you learn all the skills you need to pass all Vehcile Electrical and Electronic Systems courses and qualifications. As electrical and electronic systems become increasingly more complex and fundamental to the workings of modern vehicles, understanding these systems is essential for automotive technicians. For students new to the subject, this book will help to develop this knowledge, but will also assist experienced technicians in keeping up with recent technological advances. This new edition includes information on developments in pass-through technology, multiplexing, and engine control systems. In full colour and covering the latest course specifications, this is the guide that no student enrolled on an automotive maintenance and repair course should be without. Designed to make learning easier, this book contains: Photographs, flow charts, quick reference tables, overview descriptions and step-by-step instructions. Case studies to help you put the principles covered into a real-life context. Useful margin features throughout, including definitions, key facts and ‘safety first’ considerations.

Electric Powertrain

The primary human activities that release carbon dioxide (CO2) into the atmosphere are the combustion of fossil fuels (coal, natural gas, and oil) to generate electricity, the provision of energy for transportation, and as a consequence of some industrial processes. Although aviation CO2 emissions only make up approximately 2.0 to 2.5 percent of total global and U.S. CO2 emissions, research to reduce CO2 emissions is urgent because (1) such reductions may be legislated even as commercial air travel grows, (2) because it takes new technology a long time to propagate into and through the aviation fleet, and (3) because of the ongoing impact of global CO2 emissions. Commercial Aircraft Propulsion and Energy Systems Research develops a national research agenda for reducing CO2 emissions from commercial aviation. This report focuses on propulsion and energy technologies for reducing carbon emissions from large, commercial aircraft (twin-aisle and twin-aisle aircraft that carry 100 or more passengers) because such aircraft account for more than 90 percent of global emissions from commercial aircraft. Moreover, while smaller aircraft also emit CO2, they make only a minor contribution to global emissions, and many technologies that reduce CO2 emissions for large aircraft also apply to smaller aircraft. As commercial aviation continues to grow in terms of revenue-passenger miles and cargo ton miles, CO2 emissions are expected to increase. To reduce the contribution of aviation to climate change, it is essential to improve the effectiveness of ongoing efforts to reduce emissions and initiate research into new approaches.

Electric Vehicle Business Models

Thermal Management of Electric Vehicle Battery Systems provides a thorough examination of various conventional and cutting edge electric vehicle (EV) battery thermal management systems (including phase change material) that are currently used in the industry as well as being proposed for future EV batteries. It covers how to select the right thermal management design, configuration and parameters for the users’ battery chemistry, applications and operating conditions, and provides guidance on the setup, instrumentation and operation of their thermal management systems (TMS) in the most efficient and cost-effective manner. This book provides the reader with the necessary information to develop a capable battery TMS that can keep the cells operating within the ideal operating temperature ranges and uniformities, while minimizing the associated energy consumption, cost and environmental impact. The procedures used are explained step-by-step, and generic and widely used parameters are utilized as much as possible to enable the reader to incorporate
Electric and Hybrid Vehicles

Fully updated throughout, Electric Vehicle Technology, Second Edition, is a complete guide to the principles, design and applications of electric vehicle technology. Including all the related advances, it presents clear and comprehensive coverage of the major aspects of electric vehicle development and offers engineering-based evaluation of electric motor scooters, cars, buses and trains. This new edition includes: important new chapters on types of electric vehicles, including pickup and linear motors, overall efficiencies and energy consumption, and power generation, particularly for zero carbon-emission; expanded chapters updating the latest types of EV, types of batteries, battery technology and other rechargeable devices, fuel cells, hydrogen supply, controllers, EV modeling, ancillary systems design, and EV and the environment; new practical examples and case studies illustrating how electric vehicles can be used to substantially reduce carbon emissions and cut down reliance on fossil fuels; future concepts; electric and high-speed trains and developments in magnetic levitation and linear motors; an examination of EV efficiencies, energy consumption and sustainable power generation; MATLAB® examples can be found on the companion website ahref="http://www.wiley.com/go/electricvehicle2e" www.wiley.com/go/electricvehicle2e/a.

Explaining the underpinning science and technology, this book is essential for practicing electrical, automotive, power, control and instrumentation engineers working in EV research and development. It is also a valuable reference for academics and students in automotive, mechanical, power and electrical engineering.

Autonomous Vehicle Technology

The authors of this text have written a comprehensive introduction to the modeling and optimization problems encountered when designing new propulsion systems for passenger cars. It is intended for persons interested in the analysis and optimization of vehicle propulsion systems. Its focus is on the control-oriented mathematical description of the physical processes and on the model-based optimization of the system structure and of the supervisory control algorithms.

Electric and Plug-In Hybrid Vehicles

Thoroughly updated to encompass the significant technological advances since the publication of the first edition, Electric and Hybrid Vehicles: Design Fundamentals, Second Edition presents the design fundamentals, component sizing, and systems interactions of alternative vehicles. This new edition of a widely praised, bestselling textbook maintains the comprehensive, systems-level perspective of electric and hybrid vehicles while covering the hybrid architectures and components of the vehicle in much greater detail. The author emphasizes technical details, mathematical relationships, and design guidelines throughout the text. New to the Second Edition: New chapters on sizing and design guidelines for various hybrid architectures, control strategies for hybrid vehicles, powertrain component cooling systems, and in-vehicle communication methods. New sections on modeling of energy storage components, fire-road force mechanics, compressed air storage, DC/DC converters, emission control systems, electromechanical brakes, and vehicle fuel economy. Reorganization of power electronics, electric machines, and motor drives sections. Enhanced sections on mechanical components that now include more technical descriptions and example problems. An emphasis on the integration of mechanical and electrical components, taking into account the interdisciplinary nature of automotive engineering. As an advisor to the University of Akron’s team in the Challenge X: Crossover to Sustainable Mobility, Dr. Husain knows first-hand how to teach students both the fundamentals and cutting-edge technologies of the next generation of automotive engineers. This text shows students how electrical and mechanical engineers must work together to complete an alternative vehicle system. It empowers them to carry on state-of-the-art research and development in automotive engineering in order to meet today’s needs of clean, efficient, and sustainable vehicles.

Wireless Power Transfer for Electric Vehicles: Foundations and Design Approach

Modelling, Dynamics and Control of Electrified Vehicles provides a systematic overview of EV-related key components, including batteries, electric motors, ultracapacitors and system-level approaches, such as energy management systems, multi-source energy optimization, transmission design and control, braking system control and vehicle dynamics control. In addition, the book covers selected advanced topics, including Smart Grid and connected vehicles. This book shows how EV work, how to design them, how to save energy with them, and how to maintain their safety. The book aims to be an all-in-one reference for readers who are interested in EVs, or those trying to understand its state-of-the-art technologies and future trends. Offers a comprehensive knowledge of the multidisciplinary research related to EVs and a system-level understanding of technologies. Provides the state-of-the-art technologies and future trends. Covers the fundamentals of EVs and their methodologies.