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 storage network, and coverage of the issues involved with end-of-life management for the development of more efficient, long distance travel batteries. Contains an introductory section on the market for battery and hybrid electric vehicles discussing battery pack design and management and the issues involved with end-of-life management for these types of batteries.

Modeling and Simulation for Electric Vehicle Applications

This new edition includes approximately 30% new materials which includes an updated section on Li-ion batteries detailing the positive and negative electrodes and characteristics of other batteries including lithium, oxygen and sodium batteries. The book presents the modeling and simulation of multi-mode electronically variable transmission, which gradually became the main structure of the hybrid power-train during the last 5 years. Newly added chapter on noise and vibration of hybrid vehicles introduces the basics of vibration and noise issues associated with power-train, driveline and vehicle vibrations, and addresses control solutions to reduce the noise and vibration levels. Chapter 10 (chapter 9 of the first edition) is extended by presenting EPA and UN newly required test drive schedules and test procedures for hybrid electric mileage calculation based on window sticker considerations. In addition to the above major changes in this second edition, adaptive charging sustaining point determination method is presented to have a plug-in hybrid electric vehicle with optimum performance.

Vehicle Propulsion Systems

This book comprises the refereed proceedings of the International Conference, AIM/CCPE 2012, held in Bangalore, India, in April 2012. The papers presented were carefully reviewed and selected from numerous submissions and focus on the various aspects of research and development activities in computer science, information technology, computational engineering, mobile communication, control and instrumentation, communication system, power electronics and power engineering.
A timely comprehensive reference consolidates the research and development of electric vehicle machines and drives for electric and hybrid propulsion. It focuses on electric vehicle machines and drives. It covers the major technologies in the area including fundamental concepts and applications. It emphasizes the design criteria, performance analyses, and application examples of various motor drives and systems. Accompanying vehicle includes the simulation models and outcomes as supplementary material.

Mobile Communication and Power Engineering

The light-duty vehicle fleet is expected to undergo substantial technological changes over the next several decades. New powertrain designs, alternative fuels, advanced materials, and significant changes to the vehicle body are being driven by increasingly stringent fuel economy and greenhouse gas emission standards. By the end of the next decade, cars and light-duty trucks will be more fuel efficient, weigh less, emit less air pollutants, have more safety features, and will be more expensive to purchase relative to current vehicles. Though the gasoline-powered spark ignition engine will continue to be the dominant powertrain configuration even through 2030, such vehicles will be equipped with advanced technologies, materials, electronics and controls, and aerodynamics. And by 2030, the deployment of alternative fuels to propel and fuel vehicles and alternative modes of transportation, including autonomous vehicles, will be well underway. What are these new technologies — how will they work, and will some technologies be more effective than others? Written to inform the United States Department of Transportation’s National Highway Traffic Safety Administration (NHTSA) and Environmental Protection Agency (EPA) Corporate Average Fuel Economy (CAFE) and greenhouse gas (GHG) emission standards, this new report from the National Research Council is a technical evaluation of costs, benefits, and implementation issues of fuel reduction technologies for next-generation light-duty vehicles: Cost, Effectiveness, and Deployment of Fuel Economy Technologies for Light-Duty Vehicles estimates the cost, potential efficiency improvements, and barriers to commercial deployment of technologies that might be employed from 2020 to 2030. This report describes these promising technologies and makes recommendations for their inclusion in the list of technologies applicable for the 2017-2025 CAFE standards.

Hybrid Electric Vehicle Technology

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 dynamic 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, and how to design and test them before they are put into practice. The book also provides a clear and 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 written by successful researchers that show the deep understanding of EVs.

Sustainable Automotive Technologies 2012


New Trends in Electrical Vehicle Powertrains

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 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 hamper 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 of the current models of hybrid and electric vehicles along with the powertrain solutions adopted by the major automakers. Contributions from the world leading industry and research experts Executive summaries of specific case studies Information on basic research and application approaches

Electric and Hybrid Vehicles

The electric vehicle plug-in hybrid electric vehicle play a fundamental role in the forthcoming new paradigms of mobility and energy models. The electrification of the transport sector would lead to advantages in terms of energy efficiency and reduction of greenhouse gas emissions, but would also be a great opportunity for the introduction of renewable sources in the electricity sector. The chapters in this book show a diversity of current and new developments in the electrification of the transport sector seen from the electric vehicle point of view: first, the related technologies with design, control and supervision, second, the powertrain electric motor efficiency and reliability and, third, the deployment issues regarding renewable sources and charging facilities. This is precisely the structured approach and aimed to contribute to the literature about current research and development activities related to new trends in electric vehicle power trains.

Artificial Intelligent Techniques for Electric and Hybrid Electric Vehicles

Hybridization is an increasingly popular paradigm in the auto industry, but one that is not fully understood by car manufacturers. New hybrid electric vehicles (HEV) are designed without regard to the mechanics of the power train, which is developed similarly to its counterparts in internal combustion engines. Hybrid Electric Power Train Engineering and Technology Modeling, Control, and Simulation provides readers with an academic investigation into HEV power train design using mathematical modeling and simulation of various hybrid electric motors and control systems. This book explores the construction of the most energy efficient power trains, which is of importance to designers, manufacturers, and students of mechanical engineering. This book is part of the Research Essentials collection.

New Applications of Electric Drives

With advances driven by pressure from governments, environmental activists, and its associated industries, the subject of electric and hybrid vehicles is becoming increasingly important. Trends clearly suggest that we must educate the engineers of today with all the technical details of these vehicles. There are many books that provide descriptive descriptions of electric and hybrid vehicle components. None cover the technical aspects from a mathematically derived, design point of view, and none serve well as a textbook. Electric and Hybrid Vehicles: Design Fundamentals presents a comprehensive, systems-level perspective of these vehicles that strikes an outstanding balance between technical details, design equations, numerical examples, and design guidance. This book provides readers with an academic investigation into hybrid electric vehicles design using mathematical modeling and simulation of various hybrid electric motors and control systems. The material presented in this book is designed to be covered comfortably in a one-semester course. Its multidisciplinary nature and systems approach makes Electric and Hybrid Vehicles ideal for teaching electrical, mechanical, and chemical engineers all in one course.

Hybrid Electric Vehicles

This book explores the behavior of networks of electric and hybrid vehicles. The topics that are covered include: energy management issues for plug-in vehicles; the design of sharing systems to support electro-mobility; context awareness in the operation of electric and hybrid vehicles; and the role that they plays in a Smart City context; and tools to design and test and design and test large-scale networks of such vehicles. The book also introduces new and interesting control problems related to this context; in addition, identifying some open questions. A particular focus of the book is on the opportunities afforded by networked actualization possibilities in electric and hybrid vehicles, and the role that such actuation may play in air-quality and emissions management.

Modern Electric, Hybrid Electric, and Fuel Cell Vehicles

Modern Electric, Hybrid Electric, and Fuel Cell Vehicles is a comprehensive resource that provides up-to-date coverage of the latest developments in electric, hybrid, and fuel cell vehicles. This book covers the fundamentals of fuel cell technologies for light-duty vehicles and their applications. It provides a comprehensive overview of the technologies and systems involved in electric, hybrid, and fuel cell vehicles, including design and control strategies, performance analysis, and environmental impacts. The book is intended for engineers, researchers, and students interested in the development and implementation of these technologies in the automotive industry. It is written in a clear and concise manner, with numerous examples and case studies to illustrate key concepts. The book is organized into several chapters, each covering a specific aspect of the technology. These chapters include topics such as battery technology, fuel cell technology, and power electronics. Each chapter is supported by a set of exercises and problems, and the book concludes with a summary of key points and references for further reading. The book is a valuable resource for anyone interested in the development and implementation of electric, hybrid, and fuel cell vehicles.
The Electric Car
The authors of this text have written a comprehensive introduction to the modeling and optimization problem 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.

Hybrid Electric Vehicle Design and Control: Intelligent Omnidirectional Hybrids
The book on Sustainable Automotive Technologies aims to draw special attention to the research and practice focused on new technologies and approaches capable of meeting the challenges to sustainable mobility. In particular, the book features incremental and radical technical advancements that are able to meet social, economic, and environmental targets in both local and global contexts. These include original solutions to the problems of pollution and congestion, vehicle and public safety, sustainable vehicle design and manufacture, new structures and materials, new powertrain technologies and vehicle concepts. In addition to vehicle technologies, the book is also concerned with the broader systemic issues such as sustainable supply chain systems, integrated logistics and telematics, and end-of-life vehicle management. It captures selected peer reviewed papers accepted for presentation at the 4th International Conference on Sustainable Automotive Technologies, ICSA2012, held at the RMIT, Melbourne, Australia.

Electric and Plug-in Hybrid Vehicle Networks
Discover the Technology Behind Hybrid and Make an Intelligent Decision When Purchasing Your Next Vehicle With one billion cars expected to be on the roads of the world in the near future, the potential for war over oil and the negative environmental effects of emissions will be greater than ever before. Now is the time to seriously consider an alternative to standard automobiles. Exploring practical solutions to these problems, Hybrid Vehicles and the Future of Personal Transportation provides broad coverage of the technologies involved in manufacturing and operating automobiles. It reviews key components of hybrid and pure electric vehicles, including batteries, fuel cells, and ultracapacitors. The book also discusses both concept and production-bound hybrids as well as the economics and safety issues of hybrid ownership. In addition, the author supplies effective tips on how to save gasoline with conventional and hybrid automobiles. Making the jargon of fuel-efficient vehicles accessible to a wide audience, this guide explains the history of hybrids, how they work, and their impact on the environment. It will help you make a sound decision concerning the purchase and operation of a hybrid or electric vehicle.

Hybrid Electric Vehicles
This contributed volume contains the results of the research program "Agreement for Hybrid and Electric Vehicles" developed in the framework of the Energy Technology Network of the International Energy Agency. The topical focus lies on technology options for the system optimization of hybrid and electric vehicle components and drive train configurations which enhance the energy efficiency of the vehicle. The approach to the topic is genuinely interdisciplinary, covering insights from fields. The target audience primarily comprises researchers and industry experts in the field of automotive engineering, but the book may also be beneficial for graduate students.

Advanced Hybrid and Electric Vehicles
This book is designed as an interdisciplinary platform for specialists working in electric and plug-in hybrid electric vehicles. It presents an in-depth treatment written in a text book style (rather than a theoretical specialist text style) single volume packed with case studies and applications in-depth treatment written in a text book style (rather than a theoretical specialist text style) which covers the particular automotive design approach required for hybrid and electric vehicle 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 (AVL Cruise, IPO Caraker, AVL Concerto). This methodology is also electric vehicle and hybrid powertrain design serves to broaden understanding of how the energy flow, efficiency, range and consumption of these vehicles can be adjusted, updated and predicted via development processes.

Hybrid Electric Vehicles
Modern hybrid vehicles provide 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 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, hybrid powertrain system architecture (including plug-in and hydraulic), off-road and other industrial utility vehicles, non-ground vehicle applications like ships, locomotives, aircrafts, system reliability, ICE, storage technologies, vehicular power and energy management, diagnostics and troubleshooting, and electromechanical vibration issues. Contains core fundamentals and principles of hybrid vehicles at component level and system level. Provides graduate students and field engineers with a text suitable for classroom teaching or self-study.

Hybrid Electric Vehicle Design
Various combinations of commercially available technologies could greatly reduce fuel consumption in passenger cars, sport-utility vehicles, minivans, and other light-duty vehicles without compromising vehicle performance or safety. Assessment of Technologies for Improving Light Duty Vehicle Fuel Economy estimates the potential fuel savings and costs to consumers of available technology combinations for three types of engines: spark-ignition gasoline, compression-ignition diesel, and hybrid. According to its estimates, adopting the full combination of improved technologies in medium and large cars and pickup trucks with spark-ignition engines could reduce fuel consumption by 20 percent at an additional cost of $2,200 to the consumers. Replacing spark-ignition engines with diesel engines and components would yield fuel savings of about 37 percent at an added cost of approximately $5,900 per vehicle, and replacing spark-ignition engines with hybrid engines and components would yield fuel savings of 43 percent at an increase of $6,000 per vehicle. The book focuses on fuel consumption—the amount of fuel consumed in a given driving distance—because energy savings are directly related to the amount of fuel used. In contrast, fuel economy measures how far a vehicle will travel with a gallon of fuel. Because fuel consumption data indicate money saved on fuel purchases and reductions in carbon dioxide emissions, the book finds that vehicle stickers should provide consumers with fuel consumption data in addition to fuel economy information.

Electric and Hybrid Vehicles
Electric and hybrid vehicles are now the present, not the future. This straightforward and highly illustrated full colour textbook is endorsed by the Institute of the Motor Industry, and introduces the subject for further education and undergraduate students as a textbook. This new edition includes a new section on diagnostics and completely updated case studies. It covers the different types of electric vehicle, costs and emissions, and the charging infrastructure, before moving on to explain how hybrids and electric vehicles work. A chapter on electrical technology introduces readers to such subjects as batteries, control systems and charging which are then covered in more detail within their own chapters. The book also covers the environmental benefits of electric vehicles, including fault diagnosis and repair, and outlines the changing infrastructure, how EV technology works, and how to repair and maintain hybrid and electric vehicles. Optional IMI online learning materials enable students to study the subject further and test their knowledge. It is particularly suitable for students studying towards IMI Level 2 Award in Hybrid Electric Vehicle Operation and Maintenance, IMI Level 3 Award in Hybrid Electric Vehicle Repair and Replacement, IMI Accreditation, Car & other RV/Hybrid courses.

Hybrid Electric Vehicles
Electric and Hybrid-Electric Vehicles: Engines and powertrains
In the last few decades, electric drives have found their place in a considerable number of diverse applications. They are successfully replacing some other traditional types of drives owing to their better performance and excellent controllability. The introduction of electric drives is in most cases also beneficial to the ecological point of view as they are significantly dependent on fossil fuels and an increasing part of electric energy they consume is generated in renewable energy sources.

Lightweight Electric/Hybrid Vehicle Design
An important feature of this book is that it covers the methodology of electric and hybrid powertrain design serves to broaden understanding of how the energy flow, efficiency, range and consumption of these vehicles can be adjusted, updated and predicted via development processes.

Modern Hybrid Electric Vehicles
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Electric and Hybrid-Electric Vehicles: Engines and powertrains
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Electric Vehicle Technology Explained

The latest developments in the field of hybrid electric vehicles. Hybrid Electric Vehicles provides an introduction to hybrid vehicles, which include purely electric, hybrid electric, hybrid hydraulic, fuel cell vehicles, plug-in hybrid electric, and off-road hybrid vehicular systems. It focuses on the power and propulsion systems for these vehicles, including issues related to power and energy management. Other topics covered include hybrid vs. pure electric, HEV system architecture (including plug-in & charging control and hybrid), off-road and other industrial utility vehicles, safety and EMC, storage technologies, vehicle power and energy management, diagnosis and prognostics, and electromechanical vibration issues. Hybrid Electric Vehicles, Second Edition is a comprehensively updated new edition with four new chapters covering recent advances in hybrid vehicle technology. New areas covered include battery modelling, charger design, and wireless charging. Substantial details have also been included on the architecture of hybrid excavators in the chapter related to special hybrid vehicles. Also included is a chapter providing an overview of hybrid vehicle technology, which offers a perspective on the current debate on sustainability and the environmental impact of hybrid and electric vehicle technology. Completely updated with new chapters Covers recent developments, breakthroughs, and technologies, including new drive topologies Explains HEV fundamentals and applications Offers a holistic perspective on vehicle electrification. Hybrid Electric Vehicles: Principles and Applications with Practical Perspectives, Second Edition is a great resource for researchers and practitioners in the automotive industry, as well as for graduate students in automotive engineering.