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Hybrid Electric Vehicles Electric and Hybrid Vehicles Battery Management Systems of Electric and Hybrid Electric Vehicles **Hybrid Electric Vehicles** *Electric and Hybrid Vehicles* **Hybrid Electric Vehicles Electric and Hybrid-Electric Vehicles** Hybrid Electric Vehicle Technology Electric, Hybrid, and Fuel Cell Vehicles **Plug-in Hybrid Electric Vehicle (PHEV)** Engines and Powertrains **Artificial Intelligent Techniques for Electric and Hybrid Electric Vehicles** Hybrid and Electric Cars **Advanced Hybrid and Electric Vehicles Overviews and Viewpoints Electric and Hybrid Vehicles Hybrid Electric Vehicles** Energy Efficient Non-Road Hybrid Electric Vehicles **Electric and Hybrid Vehicles Propulsion Systems for Hybrid Vehicles** Why Plug-In Hybrid Electric Vehicles Are The Best Type Of Vehicles, Why Natural Gas Vehicles Do Not Warrant The Cost, Why Electric Cars Do Not Warrant The Cost, And The Ample Problems With Buying An Electric Vehicle Hybrid Electric Vehicle System Modeling and Control *Hybrid Systems, Optimal Control and Hybrid Vehicles* Electric and Hybrid Cars Hybrid Electric Vehicle Design and Control: Intelligent Omnidirectional Hybrids **Modern Electric, Hybrid Electric, and Fuel Cell Vehicles Technologies and Applications for Smart Charging of Electric and Plug-in Hybrid Vehicles** *Electric Powertrain* **Energy Management Strategies for Electric and Plug-in Hybrid Electric Vehicles The Electric Car Modern Electric, Hybrid Electric, and Fuel Cell Vehicles** Advanced Electric Drive Vehicles **Environmental Impacts of Road Vehicles History of the Electric Automobile Modern Electric, Hybrid Electric, and Fuel Cell Vehicles Electric and Plug-in Hybrid Vehicle Networks Overviews and Viewpoints Intelligent Control of Connected Plug-in Hybrid Electric Vehicles** Handbook of Automotive Power Electronics and Motor Drives **Fuel Cell Hybrid EVs**

Electric and Hybrid Vehicles Jul 13 2021 An advanced level introductory book covering fundamental aspects, design and dynamics of electric and hybrid electric vehicles There is significant demand for an understanding of the fundamentals, technologies, and design of electric and hybrid electric vehicles and their components from researchers, engineers, and graduate students. Although there is a good body of work in the literature, there is still a great need for electric and hybrid vehicle teaching materials. Electric and Hybrid Vehicles: Technologies, Modeling and Control – A Mechatronic Approach is based on the authors' current research in vehicle systems and will include chapters on vehicle propulsion systems, the fundamentals of vehicle dynamics, EV and HEV technologies, chassis systems, steering control systems, and state, parameter and force estimations. The book is highly illustrated, and examples will be given throughout the book based on real applications and challenges in the automotive industry. Designed to help a new generation of engineers needing to master the principles of and further advances in hybrid vehicle technology Includes examples of real applications and challenges in the automotive industry with problems and solutions Takes a mechatronics approach to the study of electric and hybrid electric vehicles, appealing to mechanical and electrical engineering interests Responds to the increase in demand of universities offering courses in newer electric vehicle technologies

Hybrid Electric Vehicle System Modeling and Control Jan 07 2021 This new edition includes approximately 30% new materials covering the following information that has been added to this important work: extends the contents on Li-ion batteries detailing the positive and negative electrodes and characteristics and other components including binder, electrolyte, separator and foils, and the structure of Li-ion battery cell. Nickel-cadmium batteries are deleted. adds a new section presenting the modelling of multi-mode electrically 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 for 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.

Propulsion Systems for Hybrid Vehicles Mar 09 2021 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 topics, 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 University, where he has lectured on hybrid propulsion systems. Dr. Miller holds 43 US patents and has authored 106 publications on automotive electrical and electronic systems. He is a Fellow of the IEEE.

Hybrid Electric Vehicles Jun 12 2021 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.

Handbook of Automotive Power Electronics and Motor Drives Jul 21 2019 Initially, the only electric loads encountered in an automobile were for lighting and the starter motor. Today, demands on performance, safety, emissions, comfort, convenience, entertainment, and communications have seen the working-in of seemingly innumerable advanced electronic devices. Consequently, vehicle electric systems require larger capacities and more complex configurations to deal with these demands. Covering applications in conventional, hybrid-electric, and electric vehicles, the Handbook of Automotive Power Electronics and Motor Drives provides a comprehensive reference for automotive electrical systems. This authoritative handbook features contributions from an outstanding international panel of experts from industry and academia, highlighting existing and emerging technologies. Divided into five parts, the Handbook of Automotive Power Electronics and Motor Drives offers an overview of automotive power systems, discusses semiconductor devices, sensors, and other components, explains different power electronic converters, examines electric

machines and associated drives, and details various advanced electrical loads as well as battery technology for automobile applications. As we seek to answer the call for safer, more efficient, and lower-emission vehicles from regulators and consumer insistence on better performance, comfort, and entertainment, the technologies outlined in this book are vital for engineering advanced vehicles that will satisfy these criteria.

Electric and Hybrid Vehicles Sep 27 2022 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 well as technicians. 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 hybrid and electric vehicles work. A chapter on electrical technology introduces learners to subjects such as batteries, control systems and charging which are then covered in more detail within their own chapters. The book also covers the maintenance and repair procedures of these vehicles, including fault finding, servicing, repair and first-responder information. Clear diagrams, photos and flow charts outline the charging infrastructure, how EV technology works, and how to repair and maintain hybrid and electric vehicles. Optional IMI online eLearning 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, C&G and other EV/Hybrid courses.

Electric, Hybrid, and Fuel Cell Vehicles Feb 20 2022 This volume of "Encyclopedia of Sustainability Science and Technology, Second Edition," covers the electrification of vehicles, which is key to a sustainable future of transportation in both light-duty and heavy-duty vehicle sectors to address global concerns of climate change, air pollutant emissions, energy efficiency and energy security. Vehicle electrification includes several existing and emerging technologies and powertrain architectures such as conventional hybrid electric vehicles (HEVs), plug-in hybrids with various electric driving range, short- and long-range battery electric vehicles, as well as hydrogen fuel cell electric vehicles (FCEVs). Electrification will be key to connected autonomous vehicles, which are perceived to improve mobility, increase safety, reduce energy consumption and infrastructure costs, improve productivity, decrease traffic congestion and increase customer satisfaction. While electrification of vehicle technologies is relatively mature, technology improvement and economies of scale are needed to compete against incumbent technologies and to realize their benefits in the marketplace. Significant infrastructure development is needed in the case of hydrogen fuel cell vehicles and to a lesser extent for plug-in electric vehicles. Vehicle efficiency improvement is sought through a combination of several approaches, including weight reduction, engine downsizing, increased engine compression ratio with high octane fuels, and the use of compression ignition engines with low octane fuels. Liquid hydrocarbon fuels are needed in applications where high storage energy density is required such as long-haul class-8 combination heavy-duty trucks. Shared mobility is another emerging concept that enables access to transportation services on an as-needed basis. This approach can enhance accessibility to transportation, decrease number of vehicles on the road, reduce energy use and impact on the environment, reduce cost of transportation and the need for parking, and reduce transportation time between origin and destination. In all, the reader will receive a comprehensive introduction to electric vehicles and technology trends, including energy storage, in light-, medium-, and heavy-duty sectors, as well as the infrastructure development that will be required to realize these benefits for society.

Intelligent Control of Connected Plug-in Hybrid Electric Vehicles Aug 22 2019 Intelligent Control of Connected Plug-in Hybrid Electric Vehicles presents the development of real-time intelligent control systems for plug-in hybrid electric vehicles, which involves control-oriented modelling, controller design, and performance evaluation. The controllers outlined in the book take advantage of advances in vehicle communications technologies, such as global positioning systems, intelligent transportation systems, geographic information systems, and other on-board sensors, in order to provide look-ahead trip data. The book contains simple and efficient models and fast optimization algorithms for the devised controllers to address the challenge of real-time implementation in the design of complex control systems. Using the look-ahead trip information, the authors of the book propose intelligent optimal model-based control systems to minimize the total energy cost, for both grid-derived electricity and fuel. The multilayer intelligent control system proposed consists of trip planning, an ecological cruise controller, and a route-based energy management system. An algorithm that is designed to take advantage of previewed trip information to optimize battery depletion profiles is presented in the book. Different control strategies are compared and ways in which connecting vehicles via vehicle-to-vehicle communication can improve system performance are detailed. Intelligent Control of Connected Plug-in Hybrid Electric Vehicles is a useful source of information for postgraduate students and researchers in academic institutions participating in automotive research activities. Engineers and designers working in research and development for automotive companies will also find this book of interest. Advances in Industrial Control reports and encourages the transfer of technology in control engineering. The rapid development of control technology has an impact on all areas of the control discipline. The series offers an opportunity for researchers to present an extended exposition of new work in all aspects of industrial control.

Electric and Hybrid-Electric Vehicles Apr 22 2022 This book chronicles recent advances in electric and hybrid-electric vehicles and looks ahead to the future potential of these vehicles. Featuring SAE technical papers -- plus articles from Automotive Engineering International magazine -- from 1997-2001, Electric and Hybrid Electric Vehicles provides coverage of topics such as: Lithium-Ion Batteries Regenerative Braking Fuel Economy Transmissions Fuel Cell Technology Hydrogen-Fueled Engines And many more Electric and hybrid-electric activities at companies such as Nissan, Mercedes-Benz, Ford, Dodge, and Toyota are also covered.

Electric and Hybrid Vehicles Apr 10 2021 A thoroughly revised third edition of this widely praised, bestselling textbook presents a comprehensive systems-level perspective of electric and hybrid vehicles with emphasis on technical aspects, mathematical relationships and basic design guidelines. The emerging technologies of electric vehicles require the dedication of current and future engineers, so the target audience for the book is the young professionals and students in engineering eager to learn about the area. The book is concise and clear, its mathematics are kept to a necessary minimum and it contains a well-balanced set of contents of the complex technology. Engineers of multiple disciplines can either get a broader overview or explore in depth a particular aspect of electric or hybrid vehicles. Additions in the third edition include simulation-based design analysis of electric and hybrid vehicles and their powertrain components, particularly that of traction inverters, electric machines and motor drives. The technology trends to incorporate wide bandgap power electronics and reduced rare-earth permanent magnet electric machines in the powertrain components have been highlighted. Charging stations are a critical component for the electric vehicle infrastructure, and hence, a chapter on vehicle interactions with the power grid has been added. Autonomous driving is another emerging technology, and a chapter is included describing the autonomous driving system architecture and the hardware and software needs for such systems. The platform has been set in this book for system-level simulations to develop models using various softwares used in academia and industry, such as MATLAB®/Simulink, PLECS, PSIM, Motor-CAD and Altair Flux. Examples and simulation results are provided in this edition using these software tools. The third edition is a timely revision and contribution to the field of electric vehicles that has reached recently notable markets in a more and more environmentally sensitive world.

Hybrid Systems, Optimal Control and Hybrid Vehicles Dec 06 2020 This book assembles new methods showing the automotive engineer for the first time how hybrid vehicle configurations can be modeled as systems with discrete and continuous controls. These hybrid systems describe naturally and compactly the networks of embedded systems which use elements such as integrators, hysteresis, state-machines and logical rules to describe the evolution of continuous and discrete dynamics and arise inevitably when modeling hybrid electric vehicles. They can throw light on systems which may otherwise be too complex or recondite. Hybrid Systems, Optimal Control and Hybrid Vehicles shows the reader how to formulate and solve control problems which satisfy multiple objectives which may be arbitrary and complex with contradictory influences on fuel consumption, emissions and drivability. The text introduces industrial engineers, postgraduates and researchers to the theory of hybrid optimal control problems. A series of novel algorithmic developments provides tools for solving engineering problems of growing complexity in the field of hybrid vehicles. Important topics of real relevance rarely found in text books and research publications—switching costs, sensitivity of discrete decisions and there impact on fuel savings, etc.—are discussed and supported with practical applications. These demonstrate the contribution of optimal hybrid control in predictive energy management, advanced powertrain calibration, and the optimization of vehicle configuration with respect to fuel economy, lowest

emissions and smoothest drivability. Numerical issues such as computing resources, simplifications and stability are treated to enable readers to assess such complex systems. To help industrial engineers and managers with project decision-making, solutions for many important problems in hybrid vehicle control are provided in terms of requirements, benefits and risks.

Overviews and Viewpoints Aug 14 2021 With production and planning for new electric vehicles gaining momentum worldwide, this book – the first in a series of five volumes on this subject – provides engineers and researchers with perspectives on the most current and innovative developments regarding electric and hybrid-electric vehicle technology, design considerations, and components. This book features 12 SAE technical papers, published from 2008 through 2010, that provide an overview of research on topics such as: The CO2 benefits of electrification The effects of aggressive driving behavior Heat recovery in hybrid vehicles The impact of drive cycles on PHEV component requirements Energy management strategies using game theory and other approaches

Energy Efficient Non-Road Hybrid Electric Vehicles May 11 2021 This book analyzes the main problems in the real-time control of parallel hybrid electric powertrains in non-road applications that work in continuous high dynamic operation. It also provides practical insights into maximizing the energy efficiency and drivability of such powertrains. It introduces an energy-management control structure, which considers all the physical powertrain constraints and uses novel methodologies to predict the future load requirements to optimize the controller output in terms of the entire work cycle of a non-road vehicle. The load prediction includes a methodology for short-term loads as well as cycle detection methodology for an entire load cycle. In this way, the energy efficiency can be maximized, and fuel consumption and exhaust emissions simultaneously reduced. Readers gain deep insights into the topics that need to be considered in designing an energy and battery management system for non-road vehicles. It also becomes clear that only a combination of management systems can significantly increase the performance of a controller.

Electric Powertrain Jul 01 2020 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 electromagnetism 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. • Presents many examples of powertrain technologies from leading manufacturers. • Discusses the dc traction machines of the Mars rovers, the ultimate EVs from NASA. • Investigates the environmental motivating factors and impacts of electromobility. • Presents a structured university teaching stream from introductory undergraduate to postgraduate. • Includes real-world problems and assignments of use to design engineers, researchers, and students alike. • Features a companion website with numerous references, problems, solutions, and practical assignments. • Includes introductory material throughout the book for the general scientific reader. • Contains essential reading for government regulators and policy makers. Electric Powertrain: Energy Systems, Power Electronics and Drives for Hybrid, Electric and Fuel Cell Vehicles is an important professional resource for practitioners and researchers in the battery, hybrid, and fuel cell EV transportation industry. The book is a structured holistic textbook for the teaching of the fundamental theories and applications of energy sources, power electronics, and electric machines and drives to engineering undergraduate and postgraduate students. Textbook Structure and Suggested Teaching Curriculum This is primarily an engineering textbook covering the automotive powertrain, energy storage and energy conversion, power electronics, and electrical machines. A significant additional focus is placed on the engineering design, the energy for transportation, and the related environmental impacts. This textbook is an educational tool for practicing engineers and others, such as transportation policy planners and regulators. The modern automobile is used as the vehicle upon which to base the theory and applications, which makes the book a useful educational reference for our industry colleagues, from chemists to engineers. This material is also written to be of interest to the general reader, who may have little or no interest in the power electronics and machines. Introductory science, mathematics, and an inquiring mind suffice for some chapters. The general reader can read the introduction to each of the chapters and move to the next as soon as the material gets too advanced for him or her. Part I Vehicles and Energy Sources Chapter 1 Electromobility and the Environment Chapter 2 Vehicle Dynamics Chapter 3 Batteries Chapter 4 Fuel Cells Chapter 5 Conventional and Hybrid Powertrains Part II Electrical Machines Chapter 6 Introduction to Traction Machines Chapter 7 The Brushed DC Machine Chapter 8 Induction Machines Chapter 9 Surface-permanent-magnet AC 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 covered ac 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, direct to discuss course content or structure.

Engines and Powertrains Dec 18 2021 With production and planning for new electric vehicles gaining momentum worldwide, this book – the third in a series of five volumes on this subject – provides engineers and researchers with perspectives on the most current and innovative developments regarding electric and hybrid-electric vehicle technology, design considerations, and components. This book features 13 SAE technical papers, published from 2008 through 2010, that provide an overview of research on electric vehicle engines and powertrains. Topics include: Hybrid-electric vehicle transmissions and propulsion systems The development of a new 1.8-liter engine for hybrid vehicles Vehicle system control software validation The impact of hybrid-electric powertrains on chassis systems and vehicle dynamics High-torque density motors, and interior permanent

magnet synchronous motors

Modern Electric, Hybrid Electric, and Fuel Cell Vehicles Sep 03 2020 "This book is an introduction to automotive technology, with specic reference to battery electric, hybrid electric, and fuel cell electric vehicles. It could serve electrical engineers who need to know more about automobiles or automotive engineers who need to know about electrical propulsion systems. For example, this reviewer, who is a specialist in electric machinery, could use this book to better understand the automobiles for which the reviewer is designing electric drive motors. An automotive engineer, on the other hand, might use it to better understand the nature of motors and electric storage systems for application in automobiles, trucks or motorcycles. The early chapters of the book are accessible to technically literate people who need to know something about cars. While the rst chapter is historical in nature, the second chapter is a good introduction to automobiles, including dynamics of propulsion and braking. The third chapter discusses, in some detail, spark ignition and compression ignition (Diesel) engines. The fourth chapter discusses the nature of transmission systems." —James Kirtley, Massachusetts Institute of Technology, USA "The third edition covers extensive topics in modern electric, hybrid electric, and fuel cell vehicles, in which the profound knowledge, mathematical modeling, simulations, and control are clearly presented. Featured with design of various vehicle drivetrains, as well as a multi-objective optimization software, it is an estimable work to meet the needs of automotive industry." —Haiyan Henry Zhang, Purdue University, USA "The extensive combined experience of the authors have produced an extensive volume covering a broad range but detailed topics on the principles, design and architectures of Modern Electric, Hybrid Electric, and Fuel Cell Vehicles in a well-structured, clear and concise manner. The volume offers a complete overview of technologies, their selection, integration & control, as well as an interesting Technical Overview of the Toyota Prius. The technical chapters are complemented with example problems and user guides to assist the reader in practical calculations through the use of common scientic computing packages. It will be of interest mainly to research postgraduates working in this eld as well as established academic researchers, industrial R&D engineers and allied professionals." —Christopher Donaghy-Sparg, Durham University, United Kingdom 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. All the chapters have been updated, and two new chapters on Mild Hybrids and Optimal Sizing and Dimensioning and Control are also included • Chapters updated throughout the text. • New homework problems, solutions, and examples. • Includes two new chapters. • Features accompanying MATLABTM software.

Overviews and Viewpoints Sep 22 2019 With production and planning for new electric vehicles gaining momentum worldwide, this book – the first in a series of five volumes on this subject – provides engineers and researchers with perspectives on the most current and innovative developments regarding electric and hybrid-electric vehicle technology, design considerations, and components. This book features 12 SAE technical papers, published from 2008 through 2010, that provide an overview of research on topics such as: The CO2 benefits of electrification The effects of aggressive driving behavior Heat recovery in hybrid vehicles The impact of drive cycles on PHEV component requirements Energy management strategies using game theory and other approaches

Hybrid Electric Vehicles Jul 25 2022 This SpringerBrief deals with the control and optimization problem in hybrid electric vehicles. Given that there are two (or more) energy sources (i.e., battery and fuel) in hybrid vehicles, it shows the reader how to implement an energy-management strategy that decides how much of the vehicle's power is provided by each source instant by instant. Hybrid Electric Vehicles: •introduces methods for modeling energy flow in hybrid electric vehicles; •presents a standard mathematical formulation of the optimal control problem; •discusses different optimization and control strategies for energy management, integrating the most recent research results; and •carries out an overall comparison of the different control strategies presented. Chapter by chapter, a case study is thoroughly developed, providing illustrative numerical examples that show the basic principles applied to real-world situations. The brief is intended as a straightforward tool for learning quickly about state-of-the-art energy-management strategies. It is particularly well-suited to the needs of graduate students and engineers already familiar with the basics of hybrid vehicles but who wish to learn more about their control strategies.

Hybrid Electric Vehicle Technology Mar 21 2022 Hybrid Electric Vehicle Technology provides foundational information about vehicles that use more than one propulsion technology to power a drive system. This textbook is filled with technical illustrations and concise descriptions of the different configurations and vehicle platforms, the operation of various systems and the technologies involved, and the maintenance of hybrid electric vehicles. Safety precautions required used when working around high-voltage vehicle systems, especially in emergencies, are highlighted.

Battery Management Systems of Electric and Hybrid Electric Vehicles Aug 26 2022 The topics of interest in this book include significant challenges in the BMS design of EV/HEV. The equivalent models developed for several types of integrated Li-ion batteries consider the environmental temperature and ageing effects. Different current profiles for testing the robustness of the Kalman filter type estimators of the battery state of charge are used in this book. Additionally, the BMS can integrate a real-time model-based sensor Fault Detection and Isolation (FDI) scheme for a Li-ion cell undergoing degradation, which uses the recursive least squares (RLS) method to estimate the equivalent circuit model (ECM) parameters. This book will fully meet the demands of a large community of readers and specialists working in the field due to its attractiveness and scientific content with a great openness to the side of practical applicability. This covers various interesting aspects, especially related to the characterization of commercial batteries, diagnosis and optimization of their performance, experimental testing and statistical analysis, thermal modelling, and implementation of the most suitable Kalman filter type estimators of high accuracy to estimate the state of charge

Hybrid Electric Vehicle Design and Control: Intelligent Omnidirectional Hybrids Oct 04 2020 Introduction. System design and implementation. Four - wheel independent steering control. Battery management system. Energy management system. Conclusions.

Why Plug-In Hybrid Electric Vehicles Are The Best Type Of Vehicles, Why Natural Gas Vehicles Do Not Warrant The Cost, Why Electric Cars Do Not Warrant The Cost, And The Ample Problems With Buying An Electric Vehicle Feb 08 2021 This essay sheds light on why plug-in hybrid electric vehicles are the best type of vehicles and elucidates why natural gas vehicles do not warrant the cost. Moreover, why electric cars do not warrant the cost is delineated and the ample problems with buying an electric vehicle are explicated in this essay. Furthermore, the criteria for how to determine if buying a car is worth the investment is demystified and how to earn substantial money online so that you can afford to finance your plug-in hybrid electric vehicle purchase is expounded upon in this essay. While it may seem far fetched, plug-in hybrid electric vehicles are the utmost best type of vehicles available for sale on the car market in the digital era. Succinctly stated, plug-in hybrid electric vehicles are the utmost best type of vehicles since they can operate off electric power or gasoline, unlike other types of vehicles. "The reason that hybrid vehicles are more efficient than conventional gasoline-only vehicles is because they have the ability to 'reclaim' energy that was once wasted, for example, the energy used when braking" ("Plug In Hybrid," 2012). Regenerative braking for instance allows plug-in hybrid electric vehicles to partially recharge their battery pack. Regenerative braking can be exhibited enroute and helps prolong the vehicle's driving duration before the plug-in hybrid electric vehicle becomes rendered inoperable. In stark contrast to a typical hybrid vehicle, the plug-in hybrid electric vehicle has the highly pragmatic ability to be recharged "by connecting it to a wall outlet in your home or elsewhere" ("Plug In Hybrid," 2012). More customers are beginning to take heed of the possibility of procuring a plug-in hybrid electric vehicles. It is far more affordable it is to operate a car off of wattage as opposed to gasoline. Customers can even convert their existing hybrid vehicles into plug-in hybrid electric vehicles. This process involves going to an auto body shop so that vehicular modifications can allow their hybrid vehicle to be able to recharged when connected into "a wall outlet in your home or elsewhere" ("Plug In Hybrid," 2012). In order for a hybrid vehicle to become a plug-in hybrid electric vehicle, an auto mechanic will need to "add extra batteries into the vehicle in order to improve the hybrid's electrical holding capacity and will also need to add a 'jack' "("Plug In Hybrid," 2012) so that it can connect "to the power grid" ("Plug In Hybrid," 2012). Even though converting a hybrid vehicle into a plug-in hybrid electric vehicle can be very costly, it is an expenditure worth paying if you profusely utilize your vehicle. Plug-in hybrid electric vehicles offer a host of benefits to vehicle owners. "The extra

battery capacity of the plug-in hybrid is the key to reaping the benefits of the plug-in hybrid electric vehicle configuration. On a conventional hybrid car, that kind of extra capacity is out of reach since the hybrid vehicle never fully charges except on long freeway trips. By adding the plug in jack with the extra battery, the plug-in hybrid electric vehicle has the ability to use its extra capacity by running on all-electric mode for an extended range of 30 miles or more. That means that instead of depleting expense gasoline, the car uses electrical energy which is much cheaper. Since most trips are less than 30 miles, that means the vehicle can operate in-town without ever using a drop of gasoline" ("Plug In Hybrid," 2012). Plug-in hybrid electric vehicles discharge minimal tailpipe emissions relative to conventional gasoline powered vehicles. This means that they help reduce mankind's carbon footprint and decelerate the rate of climate change due to a reduction of carbon dioxide emissions in the atmosphere. Furthermore, by owning a plug-in hybrid electric vehicle you are less dependent on needing gasoline to fuel your vehicle than most vehicle owners. Fortunately, a plug-in hybrid vehicles can operate off of electricity.

Energy Management Strategies for Electric and Plug-in Hybrid Electric Vehicles May 31 2020 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. 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.

Environmental Impacts of Road Vehicles Jan 27 2020 The first concerns that come to mind in relation to pollution from road vehicles are direct emissions of carbon dioxide and toxic air pollutants. These are, of course, important but the impacts of road traffic are altogether more substantial. This volume of the Issues in Environmental Science and Technology Series takes a broader view of the effects on the environment and human health, excluding only injury due to road traffic accidents. By looking across the environmental media, air, water and soil, and taking account also of noise pollution, the volume addresses far more than the conventional atmospheric issues. More importantly, however, it examines present and future vehicle technologies, the implications of more extensive use of batteries in electric vehicles and the consequences of recycling vehicles at the end of use. Finally, examples of life-cycle analysis as applied to road vehicles are reviewed. This book is a comprehensive source of authoritative information for students studying pollution, and for policy-makers concerned with vehicle emissions and road traffic impacts more generally.

Electric and Hybrid Cars Nov 05 2020 This illustrated history chronicles electric and hybrid cars from the late 19th century to today’s fuel cell and plug-in automobiles. It describes the politics, technology, marketing strategies, and environmental issues that have impacted electric and hybrid cars’ research and development. The important marketing shift from a “woman’s car” to “going green” is discussed. Milestone projects and technologies such as early batteries, hydrogen and bio-mass fuel cells, the upsurge of hybrid vehicles, and the various regulations and market forces that have shaped the industry are also covered.

Modern Electric, Hybrid Electric, and Fuel Cell Vehicles Nov 24 2019 "This book is an introduction to automotive technology, with specic reference to battery electric, hybrid electric, and fuel cell electric vehicles. It could serve electrical engineers who need to know more about automobiles or automotive engineers who need to know about electrical propulsion systems. For example, this reviewer, who is a specialist in electric machinery, could use this book to better understand the automobiles for which the reviewer is designing electric drive motors. An automotive engineer, on the other hand, might use it to better understand the nature of motors and electric storage systems for application in automobiles, trucks or motorcycles. The early chapters of the book are accessible to technically literate people who need to know something about cars. While the rst chapter is historical in nature, the second chapter is a good introduction to automobiles, including dynamics of propulsion and braking. The third chapter discusses, in some detail, spark ignition and compression ignition (Diesel) engines. The fourth chapter discusses the nature of transmission systems.” —James Kirtley, Massachusetts Institute of Technology, USA “The third edition covers extensive topics in modern electric, hybrid electric, and fuel cell vehicles, in which the profound knowledge, mathematical modeling, simulations, and control are clearly presented. Featured with design of various vehicle drivetrains, as well as a multi-objective optimization software, it is an estimable work to meet the needs of automotive industry.” —Haiyan Henry Zhang, Purdue University, USA “The extensive combined experience of the authors have produced an extensive volume covering a broad range but detailed topics on the principles, design and architectures of Modern Electric, Hybrid Electric, and Fuel Cell Vehicles in a well-structured, clear and concise manner. The volume offers a complete overview of technologies, their selection, integration & control, as well as an interesting Technical Overview of the Toyota Prius. The technical chapters are complemented with example problems and user guides to assist the reader in practical calculations through the use of common scientic computing packages. It will be of interest mainly to research postgraduates working in this eld as well as established academic researchers, industrial R&D engineers and allied professionals.” —Christopher Donaghy-Sparg, Durham University, United Kingdom 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. All the chapters have been updated, and two new chapters on Mild Hybrids and Optimal Sizing and Dimensioning and Control are also included • Chapters updated throughout the text. • New homework problems, solutions, and examples. • Includes two new chapters. • Features accompanying MATLABTM software.

Fuel Cell Hybrid EVs Jun 19 2019 With production and planning for new electric vehicles gaining momentum worldwide, this book – the fifth in a series of five volumes on this subject – provides engineers and researchers with perspectives on the most current and innovative developments regarding electric and hybrid-electric vehicle technology, design considerations, and components. This book features 14 SAE technical papers, published from 2008 through 2010, that look at innovative engineering approaches to meeting the major technological challenges associated with fuel cells. Topics covered include: Advances in powertrain systems for fuel cell vehicles Diagnostic design processes for developmental vehicles Application of two fuel cells in hybrid electric vehicles Research and design of a centrifugal compressor for fuel cell turbocharger The future of fuel cell hybrid EVs

History of the Electric Automobile Dec 26 2019 For more than a century, people have attempted to harness electricity, the clean and versatile fuel, for personal transportation. With impressive technical clarity and historical insight, author Ernest Wakefield reviews these attempts in History of the Electric Automobile: Hybrid Electric Vehicles. He focuses exclusively on electric vehicles that harness the potential of electricity when combined with another energy source - hybrid electric vehicles (HEV). The book details the historical development of capacitors, engines, flywheels, fuel cells, inductive charging, and solar cells - and the application of each to hybrid electric vehicles.

Advanced Electric Drive Vehicles Feb 26 2020 Electrification is an evolving paradigm shift in the transportation industry toward more efficient, higher performance, safer, smarter, and more reliable vehicles. There is in fact a clear trend to move from internal combustion engines (ICEs) to more integrated electrified powertrains. Providing a detailed overview of this growing area, Advanced Electric Drive Vehicles begins with an introduction to the automotive industry, an explanation of the need for electrification, and a presentation of the fundamentals of conventional vehicles and ICEs. It then proceeds to address the major components of electrified vehicles—i.e., power electronic converters, electric machines, electric motor controllers, and energy storage systems. This comprehensive work: Covers more electric vehicles (MEVs), hybrid electric vehicles (HEVs), plug-in hybrid electric vehicles (PHEVs), range-extended electric vehicles (REEVs), and all-electric vehicles (EVs) including battery electric vehicles (BEVs) and fuel cell vehicles (FCVs) Describes the electrification technologies applied to nonpropulsion loads, such as power steering and air-conditioning systems Discusses hybrid battery/ultra-capacitor energy storage systems, as well as 48-V electrification and belt-driven starter generator systems Considers vehicle-to-grid (V2G) interface and electrical infrastructure issues, energy management, and optimization in advanced

electric drive vehicles Contains numerous illustrations, practical examples, case studies, and challenging questions and problems throughout to ensure a solid understanding of key concepts and applications Advanced Electric Drive Vehicles makes an ideal textbook for senior-level undergraduate or graduate engineering courses and a user-friendly reference for researchers, engineers, managers, and other professionals interested in transportation electrification.

Plug-in Hybrid Electric Vehicle (PHEV) Jan 19 2022 Climate change, urban air quality, and dependency on crude oil are important societal challenges. In the transportation sector especially, clean and energy efficient technologies must be developed. Electric vehicles (EVs) and plug-in hybrid electric vehicles (PHEVs) have gained a growing interest in the vehicle industry. Nowadays, the commercialization of EVs and PHEVs has been possible in different applications (i.e., light duty, medium duty, and heavy duty vehicles) thanks to the advances in energy storage systems, power electronics converters (including DC/DC converters, DC/AC inverters, and battery charging systems), electric machines, and energy efficient power flow control strategies. This book is based on the Special Issue of the journal Applied Sciences on “Plug-In Hybrid Electric Vehicles (PHEVs)”. This collection of research articles includes topics such as novel propulsion systems, emerging power electronics and their control algorithms, emerging electric machines and control techniques, energy storage systems, including BMS, and efficient energy management strategies for hybrid propulsion, vehicle-to-grid (V2G), vehicle-to-home (V2H), grid-to-vehicle (G2V) technologies, and wireless power transfer (WPT) systems.

Modern Electric, Hybrid Electric, and Fuel Cell Vehicles Mar 29 2020 Air pollution, global warming, and the steady decrease in petroleum resources continue to stimulate interest in the development of safe, clean, and highly efficient transportation. Building on the foundation of the bestselling first edition, Modern Electric, Hybrid Electric, and Fuel Cell Vehicles: Fundamentals, Theory, and Design, Second Edition updates and expands its detailed coverage of the vehicle technologies that offer the most promising solutions to these issues affecting the automotive industry. Proven as a useful in-depth resource and comprehensive reference for modern automotive systems engineers, students, and researchers, this book speaks from the perspective of the overall drive train system and not just its individual components. New to the second edition: A case study appendix that breaks down the Toyota Prius hybrid system Corrections and updates of the material in the first edition Three new chapters on drive train design methodology and control principles A completely rewritten chapter on Fundamentals of Regenerative Braking Employing sufficient mathematical rigor, the authors comprehensively cover vehicle performance characteristics, EV and HEV configurations, control strategies, modeling, and simulations for modern vehicles. They also cover topics including: Drive train architecture analysis and design methodologies Internal Combustion Engine (ICE)-based drive trains Electric propulsion systems Energy storage systems Regenerative braking Fuel cell applications in vehicles Hybrid-electric drive train design The first edition of this book gave practicing engineers and students a systematic reference to fully understand the essentials of this new technology. This edition introduces newer topics and offers deeper treatments than those included in the first. Revised many times over many years, it will greatly aid engineers, students, researchers, and other professionals who are working in automotive-related industries, as well as those in government and academia.

Hybrid and Electric Cars Oct 16 2021 The Pew Group provides one of the thirteen essays here, plainly stating that hybrid and electric cars make the United States more competitive, so why don't we see these cars everywhere? Readers will explore this issue across several topics relating to these cars, including what to do with mileage taxes, whether the government should subsidize the cars, and why China does not embrace these cars.

Hybrid Electric Vehicles Oct 28 2022 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 hydraulic), off-road and other industrial utility vehicles, safety and EMC, storage technologies, vehicular power and energy management, diagnostics 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.

Hybrid Electric Vehicles May 23 2022 This book on hybrid electric vehicles brings out six chapters on some of the research activities through the wide range of current issues on hybrid electric vehicles. The first section deals with two interesting applications of HEVs, namely, urban buses and heavy duty working machines. The second one groups papers related to the optimization of the electricity flows in a hybrid electric vehicle, starting from the optimization of recharge in PHEVs through advance storage systems, new motor technologies, and integrated starter-alternator technologies. A comprehensive analysis of the technologies used in HEVs is beyond the aim of the book. However, the content of this volume can be useful to scientists and students to broaden their knowledge of technologies and application of hybrid electric vehicles.

Electric and Plug-in Hybrid Vehicle Networks Oct 24 2019 This book explores the behavior of networks of electric and hybrid vehicles. The topics that are covered include: energy management issues for aggregates of 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 this plays in a Smart City context; and tools to test and design massively large-scale networks of such vehicles. The book also introduces new and interesting control problems that are becoming prevalent in the EV-PHEV's context, as well as identifying some open questions. A particular focus of the book is on the opportunities afforded by networked actuation possibilities in electric and hybrid vehicles, and the role that such actuation may play in air-quality and emissions management.

The Electric Car Apr 29 2020 This book covers the development of electric cars -- from their early days to new hybrid models in production -- together with the very latest technological issues faced by automotive engineers working on electric cars, as well as the key business factors vital for the successful transfer of electric cars into the mass market. Considerable work has gone into electric car and battery development in the last ten years with the prospect of substantial improvements in range and performance in battery cars as well as in hybrids and those using fuel cells. This book comprehensively covers this important subject and will be of particular interest to engineers and managers working in the automotive and transport industries.

Technologies and Applications for Smart Charging of Electric and Plug-in Hybrid Vehicles Aug 02 2020 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 new 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.

Electric and Hybrid Vehicles Jun 24 2022 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 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 of 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

Artificial Intelligent Techniques for Electric and Hybrid Electric Vehicles Nov 17 2021 Electric vehicles are changing transportation dramatically and this unique book merges the many disciplines that contribute research to make EV possible, so the reader is informed about all the underlying science and technologies driving the change. An emission-free mobility system is the only way to save the world from the greenhouse effect and other ecological issues. This belief has led to a tremendous growth in the demand for electric vehicles (EV) and hybrid electric vehicles (HEV), which are predicted to have a promising future based on the goals fixed by the European Commission's Horizon 2020 program. This book brings together the research that has been carried out in the EV/HEV sector and the leading role of advanced optimization techniques with artificial intelligence (AI). This is achieved by compiling the findings of various studies in the electrical, electronics, computer, and mechanical domains for the EV/HEV system. In addition to acting as a hub for information on these research findings, the book also addresses the challenges in the EV/HEV sector and provides proven solutions that involve the most promising AI techniques. Since the commercialization of EVs/HEVs still remains a challenge in industries in terms of performance and cost, these are the two tradeoffs which need to be researched in order to arrive at an optimal solution. Therefore, this book focuses on the convergence of various technologies involved in EVs/HEVs. Since all countries will gradually shift from conventional internal combustion (IC) engine-based vehicles to EVs/HEVs in the near future, it also serves as a useful reliable resource for multidisciplinary researchers and industry teams.

Advanced Hybrid and Electric Vehicles Sep 15 2021 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.