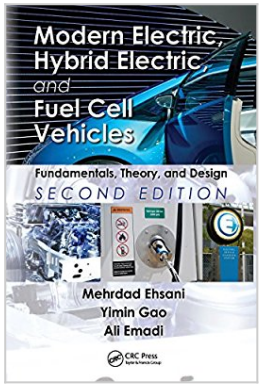

Modern Electric, Hybrid Electric, and Fuel Cell Vehicles: Fundamentals, Theory, and Design, Second Edition (Power Electronics and Applications Series)

By Mehrdad Ehsani, Yimin Gao, Ali Emadi

Modern Electric, Hybrid Electric, and Fuel Cell Vehicles: Fundamentals, Theory, and Design, Second Edition (Power Electronics and Applications Series) By Mehrdad Ehsani, Yimin Gao, Ali Emadi

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.

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Editorial Review

Review

... an outstanding job of updating and improving what was already the world's leading introductory textbook on the topic. ... The new edition couldn't have come at a better time. … If hybrid R&D in the United States is moving beyond Michigan, it is due in part to the efforts of the three authors. … This book, and the courses based on it, could transform the design and system integration of vehicles. …
?James Gover, IEEE Fellow and Professor of Electrical Engineering, Kettering University, Flint, Michigan, USA, in *IEEE Spectrum,* April 2010

About the Author

Dr. Mehrdad Ehsani has been at Texas A&M University, College Station, since 1981 and is the Robert M. Kennedy Endowed Chair of electrical engineering and director of the Advanced Vehicle Systems Research Program and the Power Electronics and Motor Drives Laboratory. He is Fellow of IEEE (Institute of Electrical and Electronics Engineers), Fellow of SAE (Society of Automotive Engineers), the recipient of the Avant Garde Award for hybrid vehicle technology development in the IEEE Vehicular Technology Society, founder of IEEE Power and Propulsion Conference, as well as numerous other honors and recognitions. He is the author of numerous books, technical publications, and patents in power electronics, motor drives, and vehicle electrical and propulsion systems.

Dr. Yimin Gao received his BS, MS, and Ph.D in mechanical engineering (major in development, design, and manufacturing of automotive systems) in 1982, 1986, and 1991, respectively, all from Jilin University of Technology, Changchun, Jilin, China. He joined the Advanced Vehicle Systems Research Program at Texas A&M University in 1995 as a research associate. Since then, he has been working in this program on research and development of electric and hybrid electric vehicles.

Dr. Ali Emadi is the Harris Perlstein Endowed Chair Professor of electrical engineering and the director of the Electric Power and Power Electronics Center and Grainger Laboratories at Illinois Institute of Technology (IIT). He is also founder and president of Hybrid Electric Vehicle Technologies, Inc. (HEVT).

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