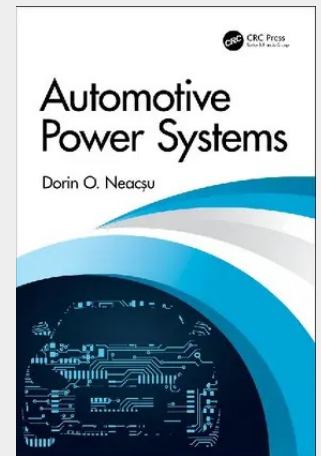


Automotive Power Systems

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

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