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TUTORIAL

Plug-in Hybrid Electric Vehicles

- Power Electronics, Battery Management, Control, and V2G

Presented by

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Synopsis

Plug-in hybrid electric vehicles (PHEVs) involve the use of larger battery packs and larger electric drivetrain components than regular HEVs. The control and management of the vehicular power electronics and energy storage systems are therefore more complicated and more challenging than those in conventional HEVs. This tutorial will explore the different design and control requirements and challenges of PHEV drivetrain components. The tutorial will cover topics such as PHEV topology, control, design, performance optimization, battery management, battery cell balancing, battery life extension, and cold weather performance enhancement. Vehicle to grid (V2G) concepts will be discussed along with the system requirements and impact of PHEV on the power grid. Some OEM and aftermarket PHEVs, such as the Chrysler Aspen PHEV and Prius PHEV will be used as case studies.

About the Speakers

Dr. Chris Mi is Associate Professor of Electrical and Computer Engineering, and Director of DTE Power Electronics Laboratory at the University of Michigan, Dearborn, Michigan, USA. He is also the Chief Technical Officer of 1Power Solutions, Inc., Associate Editor of IEEE Transactions on Vehicular Technology, and the General Chair of the Fifth IEEE International Vehicle Power and Propulsion Conference, Dearborn, Michigan, USA, September 7-11, 2009. Dr. Mi a leading expert in electric and hybrid vehicles, and has taught tutorials and seminars on the subject of HEV/PHEV for the Society of Automotive Engineers (SAE), the IEEE, NSF, and National Society of Professional Engineers. He delivered the HEV course to major automotive OEMs and suppliers, including GM, Ford, Chrysler, and Delphi. He has offered the tutorial in six countries, including the US, China, Korea, Malaysia, Singapore, and Mexico. Dr. Mi has conducted extensive research in EV/HEV space and has published more than 100 articles and delivered 30 invited talks and keynote speeches, and served as panellists.

Alain BOUSCAYROL received Ph.D. degree in Electrical Engineering from Institut National Polytechnique de Toulouse, France, in 1995. He was engaged as assistant Professor at University of Lille 1, Sciences and Technologies, France, in 1996. He has been engaged as Professor at University of Lille 1 since 2005.