



Ming Cheng (M'01–SM'02–F'15) received the B.Sc. and M.Sc. degrees from the Department of Electrical Engineering, Southeast University (formerly Nanjing Institute of Technology), Nanjing, China, in 1982 and 1987, respectively, and the Ph.D. degree from the Department of Electrical and Electronic Engineering, the University of Hong Kong, Hong Kong, in 2001, all in electrical engineering.

Since 1987, he has been with Southeast University, where he is currently a Distinguished Professor in the School of Electrical Engineering, Director of the Research Center for Wind Power Generation, and Associate Director of Yancheng Research Institute of New Energy Vehicles. From 2002 to 2009, he served as the Dean of School of Electrical Engineering, Southeast University. As a Visiting Professor, he worked in the Wisconsin Electric Machines and Power Electronics Consortium (WEMPEC), the University of Wisconsin-Madison from January to April, 2011, and in the Department of Energy Technology, Aalborg University, Denmark from June to July, 2012, respectively.

His research interests and experience include design and analysis of permanent magnet machines, variable speed motor drives for electric vehicles, wind power generator system and control, etc. Dr. Cheng has supervised over 80 graduate students, post docs, and scholars, of which two students won the National Excellent Doctoral Dissertation Nomination Award of China and five students won the Excellent Doctoral Dissertation Award of Jiangsu Province, China. He has published over 400 technical papers, 5 books and 4 book chapters, and holds over 50 issued Chinese invention patents in these areas.

Dr. Cheng received many awards including "IET Premium Award in Electric Power Application" in 2009 and 2014 respectively, "GM Automotive Innovative Talent Award for China University" in 2008, "SAE Environmental Excellence in Transportation Award-Education, Training and Public Awareness" in 2006 and "Delta Scholar Award" in 2013. He was honored with the 1st Class of Natural Science Award by Ministry of Education, China in 2013, and the 2nd Class of Science and Technology Achievement Award by Jiangsu Province, China in 2005. He has served as Executive Committee Member of IEEE Nanjing Section since 2007 and is the founder and Chair of IEEE Nanjing Section IAS/PES Joint Chapter since 2008. He has served as chair and organizing committee member for many international conferences sponsored by IEEE IAS/PES/IES. He has served as the Expert Panel Member in the National Natural Science Foundation of China (NSFC) and in the National Key Basic Research Program (973 Program) of China, Editorial Board Member of the *Energy Conversion and Management*, *Sustainable Energy*, the *Transactions of China Electrotechnical Society*, the *Proceedings of the Chinese Society for Electrical Engineering*, etc.

Dr. Cheng was elevated to IEEE Fellow in 2014 for contributions to the development and control of stator permanent magnet machines for vehicular propulsion and wind power generation. He is also a fellow of The Institution of Engineering and Technology (IET).

Contact Information:

Prof. Ming Cheng, *Ph.D., FIEEE, FIET*

School of Electrical Engineering

Southeast University

No. 2 Si Pai Lou, Nanjing 210096

The People's Republic of China

E-mail: cheng_ming@ieee.org

Tel: ++86 25 83794152 (O), 52070046(H)

Fax: ++ 86 25 83791696

Lecture Topics

1. Electric Motor Drives and Control for Electric/Hybrid Vehicles

Abstract

With ever-increasing concerns on our environment, there is a fast growing interest in electric vehicles (EVs) and hybrid EVs (HEVs) from automakers, governments, and customers. As electric motor drives are the core of both EVs and HEVs, it is a pressing need for researchers to develop advanced electric-drive systems. In this lecture, the development status of EVs/HEVs in China will be firstly introduced. The general requirement of traction motor drive for EV/HEVs is discussed. An overview of permanent-magnet (PM) brushless motor drives for EVs and HEVs is presented, with emphasis on machine topologies, drive operations, and control strategies. Then, major research directions of the permanent magnet brushless motor drive systems are elaborated, including the stator PM motor drive and fault-tolerant control, magnetic-gear outer-rotor PM motor drive, and the electric variable transmission (EVT) system.

2. Wind Power Generator Systems and Control Technology

Abstract

With increasing concerns on energy crisis and environmental deterioration, the development and utilization of wind energy is attracting more and more attention. Hence, various new wind energy conversion technologies have been emerging in the past decade, aiming at reducing cost, enhancing efficiency and reliability. In this lecture, development status of wind power will be firstly introduced. Then the state of the art of wind energy conversion systems (WECS) and technologies, with an emphasis on wind power generator and control will be overviewed. Different types of common WECSs are classified according to their features and drive train types, and comparison of them are conducted on the basis of the volume, weight, cost, efficiency, system reliability and fault ride through capability. Finally, the major research directions of wind energy conversion technologies are elaborated, including the brushless doubly fed induction generator, the stator permanent magnet synchronous generators, the magnetic-gear generators, the dual power flow WECS with the electrical variable transmission (EVT) machine, etc.

3. Development and Control of Stator Permanent Magnet Brushless Machines

Abstract

As a topology of novel brushless permanent magnet (PM) machines, stator-PM brushless machines having magnets and armature windings in stator (the so-called stator-PM machines), exhibit the merit of convenient heat dissipations. The compact and robust rotor structure also makes stator-PM machines potential candidates for high speed applications. Meantime, the air-gap flux regulations can be realized by hybrid excitations of PMs and field windings, which consequently expands the speed adjustment regions. Overall, the stator-PM machine features the definite advantages of robust structure, high power density and efficiency, high fault-tolerant capability and being applicable of various control strategies. In this lecture, an overview on the stator-PM brushless machine systems and their key technologies is conducted, with particular emphasis on machine topologies, operation principles, design and analysis features, and control strategies. Furthermore, the flux regulation strategies and fault-tolerant control strategies are presented. Finally some potentials of feasible applications for the stator-PM brushless machines in electrical vehicles, flywheel energy storage system, and urban rail transit, are discussed.