

Bio of Dr. Hua GENG



Hua Geng received the B.S. degree in electrical engineering from Huazhong University of Science and Technology, Wuhan, China, in 2003 and the Ph.D. degree in control theory and application from Tsinghua University, Beijing, China, in 2008. From 2008 to 2010, he was a Postdoctoral Research Fellow with the Department of Electrical and Computer Engineering, Ryerson University, Toronto, ON, Canada. He joined Automation Department of Tsinghua University in June 2010 and is currently a full professor.

His current research interests include advanced control on power electronics and renewable energy conversion systems, AI for energy systems. He has authored more than 300 technical publications and holds more than 30 issued Chinese/US patents. He was the recipient of IEEE PELS Sustainable Energy Systems Technical Achievement Award. He is the Editor-in-Chief of IEEE Trans. on Sustainable Energy. He served as general chair, track chairs and session chairs of several IEEE conferences. He is an IEEE Fellow and an IET Fellow, convener of the modeling working group in IEC SC 8A.

Prof. Geng has been invited to give keynote speaks, tutorials, short courses, talks, in 50+ international events (conferences, PhD. Schools, etc.). Some recent ones are listed below:

- Keynote speech at the 5th International Conference on Power Engineering (ICPE 2024), “Distributed Stability Control for Renewable Energy Clusters”, Shanghai, China, Dec., 2024.
- Keynote speech at the 5th Asia Energy and Electrical Engineering Symposium (AEEES 2023), “Synchronization of Grid-tie Power Converter for Renewable Energy Integration”, Chengdu, China, March, 2023.
- Keynote speech at the 9th International Conference on Electrical Engineering, Control and Robotics (EECR), “Modeling of Renewable Power Plant for Power System Dynamic Studies”, Wuhan, China, February, 2023.
- Keynote speech at the 9th International Conference on Power Electronics Systems and Applications (PESA), “Control and Optimization of Wind Turbine Clusters”, Hong Kong, September, 2022.
- Short course at CPSS Summer Program on Design and Application of Photovoltaic and Energy Storage Power Supply, “Stability of renewable power plant: modeling, analysis and control”, Hefei, China, July 2022.
- Tutorial at the 47th Annual Conference of the IEEE Industrial Electronics Society (IECON), “Transient stability of power electronics-dominated power networks: principle and application”, Toronto, Canada, October, 2021.

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IEEE Membership Number: 80692227

Topic 1- Wind energy conversion system: principle, modeling and control

Abstract:

This lecture focuses mainly on the operation principle, modeling and control of wind energy conversion system. The wind turbine fundamentals, such as its history, components, structure, operation principle will be presented and discussed. Different topologies of power converters for wind energy conversion will be discussed and shown with typical real products around the world. Modeling and control strategies of wind power plant for high efficiency operation and stable grid integration will be highlighted.

Topic 2- Intelligent control of renewable power cluster

Abstract:

In this lecture, the intelligent control design of renewable power cluster with numbers of power units will be discussed. The reason why the traditional control architecture is not suitable for renewable power cluster is firstly analyzed. Compared with the composition and operation mode of human society, the three-layer intelligent control architecture including synchronization, cooperation and game is then introduced. The design of each layer controller will be discussed in details. An example about how to implement the intelligent control technique in wind farm is finally provided.

Topic 3- Power quality control of large-scale renewable energy integrated power system

Abstract:

With the increase of renewable energy in modern power systems, power quality issues, such as harmonics, voltage and frequency instability, etc., have taken on new characteristics. This lecture will focus on exploring the power quality issues of integrated power systems with different types of renewable power plants from the perspectives of modeling and analysis, characteristics and mechanisms, control and application. Technical challenges and open problems of power quality control in 100% renewable energy driven power network will also be discussed.

Topic 4- Stability of power electronics-dominated power networks: principle and application

Abstract:

This talk will present the definition, basic principle, the latest research progress, and the applications of stability for power electronics-dominated networks. Specifically, the content includes the principle, approaches, and classification of power electronic converter synchronization, the modeling, analysis, and stability evaluation methods, the difference and connection with the conventional power network stability, stability improvements strategies, and important references for grid code specifications.