

Lectures on Power Electronics and Mechatronics

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Director of the Power Electronics Research Laboratory at Kansas State University

On Grid-Interactive Inverters in Grid-Following and Grid-Forming Modes

Some recent advancements and challenges in controlling inverters as the enabling technology for networked power grids will be discussed in this talk. Energy sectors are interested in novel configurations for power distribution systems in future smart cities with interconnected smart buildings and substations resilient to physical and cyber-attacks. The trend toward the networked power grids and the integration of more renewable energy sources has led to new challenges and opportunities for innovation in the autonomous control of inverters to operate in both grid-following and grid-forming modes. Black-start, self-governing, and self-protection are perhaps the most challenging problems for autonomous control of inverters and fully realizing self-powered microgrids that will be presented in this seminar.

Biography

Behrooz Mirafzal is a Professor of Electrical Engineering and the Power Electronics Research Laboratory director at Kansas State University. He is also the author of a textbook titled Power Electronics in Energy Conversion Systems (McGraw Hill, 2021) and 120 technical articles. His current research interests include power electronics applications in energy conversion systems and grid-interactive inverters. He was the recipient of the 2008 second-best IEEE Industry Applications Society (IAS) Transactions Paper Award, the best 2012 IEEE Power and Energy Society Transactions Paper Award, a 2014 U.S. National Science Foundation CAREER Award, the 2019 Frankenhoff Outstanding Research Award (KSU), and the third-best 2020 IEEE IAS Transactions Committee Paper Award. Dr. Mirafzal has served as an Associate Editor for the IEEE Transactions on Industry Application Society since 2011 and the IEEE Transactions on Power Electronics since 2018. He currently serves as the secretary of the IEEE IAS Renewable and Sustainable Energy Conversion Systems Committee.