FEEDER Foundations for Engineering Education for Distributed Energy Resources

Spring 2018 Seminar Series

Modeling and Simulation of Machine/Power-Electronic Interfaces

FRIDAY MARCH 23, 2018

2:00 PM – HEC 356

Abstract

This seminar introduces the modeling and simulation of systems that contain a mixture of electric machines and power electronic components. Such systems can be found in electric drive systems, dc power systems, renewable energy, and conventional synchronous machine excitation. The seminar presents techniques for constructing numerical average-value models (AVMs) of such systems. The essential numerical functions for these models are extracted from detailed simulations and vary depending on the loading conditions. Numerical AVMs for rotating rectifiers in brushless excitation systems are presented and highlight existing difficulties with numerical AVM modeling and simulation. A new approach for AVM simulation of machine/power-electronic interfaces is discussed, which is capable of accurately representing both steady-state and transient conditions without inverting the voltage-current interfaces on either the ac or dc sides. This model can be simply incorporated in simulation models with traditional voltage-in, current-out formulations. Experimental results showing the advantages of the new approach are discussed, and potential applications of such modeling and simulation are highlighted.

Ms. YuQi Zhang

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Biography

YuQi Zhang received the B. S. degree in electrical engineering from the Harbin Institute of Technology, Harbin, China, in 2005 and the M. S. E. E. degree from the University of Kentucky, Lexington, KY, USA, in 2014, where she is a currently working towards the Ph. D. degree in electrical engineering. Her research interests include electric machine modeling and simulation, power electronics, and power systems.