Advanced Electric Drives: Analysis, Control, and Modeling Using MATLAB / Simulink

Ned Mohan

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Advanced Electric Drives: Analysis, Control, and Modeling Using MATLAB / Simulink Ned Mohan With nearly two-thirds of global electricity consumed by electric motors, it should come as no surprise that their proper control represents appreciable energy savings. The efficient use of electric drives also has far-reaching applications in such areas as factory automation (robotics), clean transportation (hybrid-electric vehicles), and renewable (wind and solar) energy resource management. *Advanced Electric Drives* utilizes a physics-based approach to explain the fundamental concepts of modern electric drive control and its operation under dynamic conditions. Author Ned Mohan, a decades-long leader in Electrical Energy Systems (EES) education and research, reveals how the investment of proper controls, advanced MATLAB and Simulink simulations, and careful forethought in the design of energy systems translates to significant savings in energy and dollars. Offering students a fresh alternative to standard mathematical treatments of dq-axis transformation of a-b-c phase quantities, Mohan's unique physics-based approach "visualizes" a set of representative dq windings along an orthogonal set of axes and then relates their currents and voltages to the a-b-c phase quantities. *Advanced Electric Drives* is an invaluable resource to facilitate an understanding of the analysis, control, and modelling of electric machines.

• Gives readers a "physical" picture of electric machines and drives without resorting to mathematical transformations for easy visualization

• Confirms the physics-based analysis of electric drives mathematically

• Provides readers with an analysis of electric machines in a way that can be easily interfaced to common power electronic converters and controlled using any control scheme

• Makes the MATLAB/Simulink files used in examples available to anyone in an accompanying website

• Reinforces fundamentals with a variety of discussion questions, concept quizzes, and homework problems

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