

Educational Short Course 1: Fundamentals of Electric Machines and Drives for Traction Applications

Wednesday, September 7, 2011, 2:00 PM – 5:30 PM

Speaker: Dr. Nicholas J. Nagel
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Short Biography: Nicholas J. Nagel received a B.S. degree in mechanical engineering from the University of Illinois – Champaign/Urbana in 1989. He received the M.S. degrees in mechanical and electrical and computer engineering and Ph.D. degree in mechanical engineering from the University of Wisconsin – Madison in 1995, 1996, and 1998, respectively, with a focus in control of electric machinery. His Ph.D. thesis was on modeling and control of switched reluctance machines. He is currently employed at Triumph Aerospace systems – Seattle, Washington, where his research is focused on high performance motion and motor control for aerospace applications. His interests include electric machines, machine drives, control systems, power electronics, and electro-mechanics.

Short Course Description: Electric machines and drives are the backbone of hybrid electric and electric vehicles. This short course will provide an overview of electric machines and drives. The course will be broken up into two sections. Section one will cover the fundamentals of electric machines. We will discuss the physics of machines and modeling techniques to simulate machine behavior. The course will cover permanent magnet AC (PMAC), AC induction, and switched reluctance (SR) machines. Section two will cover the basics of machine drives and inverter control. An overview of four quadrant torque control for each of the machine types will be presented.