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" RECENT TRENDS IN ENERGY EFFICIENT AC MOTOR DRIVES "

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Abstract – The presentation deals with recent trends in the development of drives with AC motors, both three phase squirrel cage induction motor and three phase synchronous motor with permanent magnets on the rotor. Two applications are considered, low cost appliance drives and high performance drives for electrical vehicles. First, different solutions which lead to relatively cheap and mass production ready general purpose appliance drives are described. Special attention is paid to methods for improving energy efficiency of appliance drives with both induction motor and permanent magnet synchronous motor. Examples of achieved energy efficiency of both motor types are presented. Second, the high performance drive solution for electrical vehicles powered with low voltage AC motor is discussed. The high performance and the safety of operation and robustness of those drives during significant excursions of motor parameters and battery power supply variation are discussed. More detailed example is the methods for achieving both MTPA and energy efficiency for low voltage induction motor drive power by 48V battery in electrical golf-cart application. Both modes of operation are developed and tested to provide overall satisfactory electrical golf-cart performance at different terrains and loading conditions.

Author's Biography

Darko P. Marčetić received the M.S. and Ph.D. degree from the Electrical Engineering Faculty, University of Belgrade, 1998 and 2006. In the period 2000–2006, he was with Motor Technology Center, Emerson Electric, St. Louis, MO and Emerson Appliance Controls, Elgin, IL, designing low-cost AC drives. Since 2006 he is full professor at University of Novi Sad, Serbia, teaching course in digital control of electrical drives. He published over 20 international journal papers, holds more than 10 patents and serves as reviewer for different IEEE journals and conferences. His current research areas are digital control of low voltage AC motors for electrical vehicles applications.