Research Seminar

Date: 13 May 2009
Time: 4:00 PM
Place: New Power Engineering Auditorium, Building J03 Level 2
Speaker: Dr Tobias Geyer, The University of Auckland, New Zealand

Title: Model Predictive Direct Torque Control: Algorithm, Performance Evaluation and Recent Developments

Summary: Model Predictive Direct Torque Control (MPDTC) is an emerging drive control concept at the intersection of power electronics and modern control theory with a solid industrial support. MPDTC adopts the methodology of Model Predictive Control (MPC) and applies it to the Direct Torque Control (DTC) problem of medium-voltage electrical drives. The controller computes switching patterns online with the goal to simultaneously reduce the inverter switching losses and the torque THD, while keeping the drive’s controlled variables within specific bounds and maintaining the favourable dynamic properties of standard DTC.

The first part of the talk introduces the MPDTC concept using as an example ABB’s ACS 6000 drive (a 3-level voltage source inverter driving an induction machine). ABB’s successful implementation of MPDTC on their control platform and experiments on a 2.5 MVA drive are briefly shown, which prove the advantages of MPDTC and accurately verify initial simulation results. The second part of the talk highlights recent developments that generalize the MPDTC algorithm, minimize the switching losses, implement the algorithm efficiently and extend the concept to other topologies including a five-level inverter.

Everyone is welcome