Seminar 25   Sunday June 17, 2001

"SENSORLESS CONTROL OF AC MACHINES" (PERMANENT MAGNET SYNCHRONOUS MOTORS, INDUCTION MOTORS)   9:00am - 6:00pm

Instructor: Prof. Dr. Manfred Schrödl, Vienna University of Technology, Austria

ABOUT THE INSTRUCTOR

Prof. Dr. Manfred Schrödl achieved his Dipl.Ing. (1982), Dr.(1987) and habilitation degree (1992) at TU Vienna. Between 1992 and 1996 he was head of the development department of ELIN Vienna, from 1996 to 1998 he was head of central technical division of ATB Austria Antriebstechnik, Spielberg (Styria, Austria). Since February, 1998 he is head of the Institute of Electrical Drives and Machines at Vienna University of Technology. He has about 50 publications and 10 patents mainly in the field of Electrical Drives. The actual main research field is Sensorless Control of AC machines.

CONTENTS

The tutorial shows methods of speed-sensorless control of induction machines and permanent magnet synchronous machines (PMSMs, EC motors, Brushless DC motors, respectively). The presented methods offer the possibility of a relatively simple implementation in industrial drives and hence, methods with high mathematical expense will only be mentioned briefly.

Highlights: Sensorless drives for arbitrary speed including standstill, practical realizations.

- **Introduction**
- **Basic inverter structure for sensorless IM and PM drives**
- **General mathematical description of AC machines**
- **The Permanent Magnet Synchronous Motor – Modelling, Control**
- **Sensorless rotor position detection of the PMSM**
  Sensorless position detection at high speed
  Position detection at low speed and standstill (INFORM method)
  (INFORM = **IN**direct **F**lux detection by **O**n-line **R**eactance **M**easurement)
  Improving the estimated rotor position and developing estimated speed
- **The Induction Motor – Modelling and Control**
- **Sensorless rotor flux angular position detection of the IM**
  Sensorless flux detection at high speed
  Sensorless flux detection at low speed
  Improving the estimated rotor flux position
- **Practical example (Demonstration)**
  INFORM-controlled sensorless PM drive in speed controlled application with high starting torque
  INFORM-controlled sensorless PM drive in a positioning application
  (The PM drives a linar axis without any position measurement)
  Discussion on the properties of the drive and possible applications

WHO SHOULD ATTEND

- R&D engineers in the field of speed-variable electrical drives (e.g. positioning drives, automotive, automation, traction, pumps and fans, elevators, chemical and machinery industry)
- Diploma and doctoral students of Electrical Engineering
- Project managers of industrial and scientific drive projects

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