

Seminar 19 Monday June 18, 2001

MODELING AND SIMULATION FOR POWER ELECTRONICS AND ELECTRICAL DRIVES 9:00am - 6:00pm

**Instructors: Pavol Bauer, Delft University of Technology, The Netherlands,
Peter van Duijsen, Simulation Research, The Netherlands**

ABOUT THE INSTRUCTORS

Pavol Bauer received his Masters in Electrical Engineering at the Technical University of Kosice and PhD from the Delft University of Technology. Since 1990 he is with the Delft University of Technology. Mr. Bauer published over 60 papers in his field. He is reviewer of different IEEE proceedings and member of the International Technical Committee of several conferences. His research interest include power electronic circuit topologies, soft switching, simulation of power electronics, control and dynamic analysis of power converters.

Peter van Duijsen has worked with computer simulation and power electronics for over 10 years. After receiving his Masters in Electrical Engineering and working at the Technical University of Delft, he founded Simulation Research and developed the simulation program CASPOC.

CONTENTS

The aim of the seminar is to teach the participants how to efficiently use modeling and simulation in power electronics and electrical drive design. The participant will learn where to use modeling and simulation and how to choose for an appropriate tool.

THEORY

- Introduction in modeling and simulation (Models for transient analysis, State Space, State Space Averaging, Mathematical background of various simulation programs, Multilevel programs, Multilevel modeling)
- The simulation and modeling of future integrated power electronics will be reviewed and the theoretical background will be given.
- Understand how simulation packages such as SIMULINK, EMTD and SPICE work and how to apply the right package for a specific simulation problem
- Introduction in dedicated tools for modeling power electronics and drives

PRACTICAL EXAMPLES

The seminar will be conducted in a PC class for hands-on experience. It includes the practical evaluation of several simulation examples of power electronics and electrical drives using the CASPOC simulation program:

- Modeling and simulation of DC and AC power electronics and control.
- Hands-on experience using different programs such as Spice, Matlab/Simulink, Power 4-5-6 and Caspoc, to see the advantages/disadvantages of the various programs.
- Multilevel modeling of electrical drives (power electronics, induction machine, mechanical load and control)(Stepper motors, Brushless DC, Vector control)
- Animation of circuits and drives.
- Working with phasors, Park-transformations, digital control and building component models.

HANDOUTS

Each participant will receive the CASPOC-Express version of the simulation program for power electronics and electrical drives, including manual and examples. Further handouts include presented materials.

WHO SHOULD ATTEND

Engineers, managers and researchers working in the field of power electronics and electrical drives.

(* The seminar will be conducted in a PC class for hands-on experience, English and German speaking instructors)