

Jeudi 11 août 2016 à 14 h au local 2223 Albert-Tessier UQTR

CONFÉRENCE

Predictive Control - the Powerful Method to Control Power Converters and Drives in the Future

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Résumé :

Up to the present the control of electrical power using power converters has been based on the principle of mean value, using pulse width modulation with linear controllers in a cascaded structure. Recent research works have demonstrated that it is possible to use Predictive Control to control electrical energy with the use of power converters, without using modulators and linear controllers. This is a new approach that will have a strong impact on control in power electronics in coming decades.

The main advantages of predictive control are:

- Concepts are very intuitive and easy to understand.
- It can be applied to a great variety of systems.
- The multivariable case can be easily considered.
- Dead times can be compensated.
- Easy inclusion of non-linearities in the model.
- Simple treatment of constraints.
- The resulting controller is easy to implement.
- This methodology is open to include modifications and extensions depending on specific applications.

The participants of this tutorial will learn:

- The basic concepts and ideas.
- Different types of predictive controllers.
- Detailed examples of predictive controllers.

Prof. Ralph Kennel M.

Distinguished Lecturer for the following topics:

- Predictive Control - the Powerful Method to Control Power Converters and Drives in the Future
- Encoderless Control of AC Drives
- Encoders for Simultaneous Sensing of Position and Speed - a Bottleneck in Electrical Drives with Digital Control
- Hardware-in-the-Loop Systems with Power Electronics - a Powerful Simulation Tool

Academic Career and Research Areas

The research activities of Prof. Kennel (b. 1955) cover the traditional field of electrical drive systems but also sensorless and encoderless control of electric drives, the predictive control of power converters and “hardware in the loop” power electronics systems. Through its wide range of teaching and lecturing topics, the Chair of Electrical Drive Systems and Power Electronics provides a solid base for forward-looking training in system engineering and drive technology.

After completing his graduate study at the University of Kaiserslautern, Prof. Kennel completed his doctorate in 1984. He held a number of positions at Robert Bosch GmbH up until 1999. From 1994 to 1999 he also held the position of visiting professor at the University of Newcastle-upon-Tyne, England. After that, he held the Chair of Electric Machines and Drives at Bergische Universität Wuppertal. In 2008, he was appointed full professor at TUM. Prof. Kennel is a senior member of the IEEE, an IET fellow, a chartered engineer in the UK and a member of the EPE Association and the VDE (Kurpfalz district).