



DIPARTIMENTO DI INGEGNERIA INDUSTRIALE
DEPARTMENT OF INDUSTRIAL ENGINEERING



UNIVERSITÀ
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IEEE Italy Section IAS/PELS/IES North Italy Joint Chapter



Seminar Announcement

The IEEE IAS/PELS/IES North Italy Joint Chapter in collaboration with the Electrical Drives Laboratory (EDLab) of the Industrial Engineering Department, University of Padova, invites you to attend the Seminar

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

by Prof. Dr.-Ing. Ralph Kennel
Electrical and Computer Engineering Dept., TUM Technische Universität München (D)

held at the Department of Industrial Engineering, via Gradenigo 6/a, Padova ,

on Tuesday September 13rd, 2016, from 10 to 12am, Sala Merigliano

Abstract of the Seminar - *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.*

A presentation of selected activities of EDLab will follow the Seminar.

Attendance at the Seminar is free of charge until all seats.

For organization reasons, those wishing to participate are invited to inform by an email to edlab@dii.unipd.it.

For further information, please contact prof. Bolognani: mob. 320 434 7348, silverio.bolognani@unipd.it



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 (Kurfalz district).