Advanced Control Engineering

CERN – IFAC/CEA

Introduction

EN/ICE Automation Seminars

CERN, 2nd, 3rd June 2014

EN/ICE Automation Seminars

Spread out knowledge in Automation at CERN

- Past Seminars
  - Industrial Communications (2)
    - EtherCAT (M. Rostan, EtherCAT)
    - Profinet (W. Schroeder, SIEMENS)
  - PID control
    - Prof. Cesar de Prada, UVA

https://indico.cern.ch/category/4856/

Workshop goal

- IFAC/CEA and the Control Engineering group action: **Industry day 3rd edition**
  - Get closer to the real use of control engineering in industry (e.g. Petroleum refinery, thermoplastics)

- **Exchange** Academia – Industry knowledge
  - Existing CERN projects involving advanced control engineering
  - Lectures focused on some CEA members research topics

IFAC: International Federation of Automatic Control

Overview

(https://indico.cern.ch/event/303961)

IFAC/CEA visitors

Universidad de Oviedo

Universidad de Leon

Universidad de Valladolid

Universidad de Sevilla

Universidad de Huelva

Universidad Autónoma de Barcelona

Universidad Politécnica de Valencia

Programme

- Two sessions:
  - 2nd June: CERN use cases
  - 3rd June: IFAC/CEA lectures

CERN use cases

- **CERN industrial control**
  Ph.D. Philippe Gayet
- **Model-Based Predictive Control applied to the LHC magnets temperature control**
  Ph.D. Enrique Blanco
- **High precision current control of the LHC Power Converters**
  Hugues Thiesen
- **Control and simulation of cryogenic plants at CERN**
  Ph.D. Benjamin Bradu
- **Design and performance of the LHC beam-based feedback systems**
  Ph.D. Ralph Steinhagen
- **Formal methods applied to PLC code verification**
  Borja Fernandez Adiego

IFAC/CEA lectures

- **Recent advances in PI/PID tuning**
  - *Ph.D.* Ramon Vilanova (UAB)
- **Overview of Model Predictive Control**
  - *Prof.* Cesar de Prada (UVA)
- **Multi-objective optimization for engineering design**
  - *Ph.D.* Xavier Blasco (UPV)
- **A Visual Analytics approach for process analysis**
  - *Ph.D.* Ignacio Diaz Blanco (UOVI)

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