

Symposium on Stability Assessment and Intelligent Control for Sustainable Electrical Power Systems

Delft University of Technology -TU Delft, Delft Netherlands

Friday, 20th April 2018

1. Introduction

Traditionally, electrical power systems worldwide have been planned and operated in a relatively conservative manner, in which power system security, especially stability (i.e. dynamic performance under disturbances), has not been considered as a major issue. Most of the tools developed and applied for these tasks were conceived to deal with reduced levels of uncertainty and have proven to be helpful to identify optimal developmental and operational strategies that ensure maximum net techno-economic benefits, in which only the fulfilment of steady-state performance constraints has been tackled.

The societal ambition of a cleaner, sustainable, and affordable electrical energy supply is motivating a dramatic change in the infrastructure of transmission and distribution systems in order to catch up with the rapid and massive addition of evolving technologies for power generation based on renewable energy sources, particularly the wind and solar photovoltaics. In addition to this, the emergence of the prosumer figure and new interactive business schemes entail operations within a heterogeneous and rapidly evolving market environment.

In view of this, power system security, and, especially, the analysis of vulnerability (possibility that dynamic response violate the technical limits) and possible mitigation measures against disturbances deserve special attention, since planning and operating the electric power system of the future involves dealing with a large volume of uncertainties that are reflected in highly variable operating conditions and will eventually lead to unprecedented events.

This symposium will present recent developments in modelling, simulation, assessment methods, and design of intelligent controls for systems with massive penetration of power electronic interfaced devices in generation, demand, and transmission. It brings together scholars, scientists and researchers in a collaborative environment to present and discuss issues relating to current tendencies in these research topics.

2. Objective

Share knowledge and vision of forthcoming modelling and simulation techniques for future energy systems.

2. Duration

Symposium: 09:00-15:00

Location: Lecture Hall π (Pi), Building B36 (Faculty of Electrical Engineering, Mathematics and Computer Science).

The building B36 is located at Mekelweg 4, 2628 CD Delft, Netherlands.

How to get there?

<https://www.tudelft.nl/en/eemcs/the-faculty/departments/applied-mathematics/applied-probability/events/seminars/how-to-get-here/>

4. Expected Background of Participants:

Basics of power system analysis, modelling, and simulation.

5. Expected Audience:

This workshop is addressed to scholars, researchers, PhD students, Senior MSc students as well as engineers from industry having research interests in modelling and simulation of power systems.

6. Programme:

- 09:00 **Arrival and registration**
- 09:20 **Welcome and opening**
Prof. John Schmitz, Dean of the Faculty of Electrical Engineering, Mathematics and Computer Science (EEMCS), TU Delft, Netherlands
Prof. Peter Palensky, Head of Section Intelligent Electrical Power Grids, EEMCS, TU Delft, Netherlands
- 09:40 **Keynote speaker 1:**
Presentation of book: "Dynamic Vulnerability Assessment and Intelligent Control: For Sustainable Power Systems"
Dr. Jose Rueda, TU Delft, Netherlands
- 10:10 **Keynote speaker 2:**
Presentation of book "Advanced Smart Grid Functionalities Based on PowerFactory"
Dr. F. Gonzalez-Longatt, Loughborough University, United Kingdom
- 10:40 **Keynote speaker 3:**
"Steady-state security and short-term reliability management"
Dr. Evelyn Heylen, Katholieke Universiteit Leuven, Belgium

- 11:10 **Keynote speaker 4:**
“Challenges Ahead Risk-Based AC Optimal Power Flow Under Uncertainty for Smart Sustainable Power Systems”
Dr. Florin Capitanescu, Luxembourg Institute of Science and Technology, Luxembourg
- 11:40 **Keynote speaker 5:**
“Decentralized control of active distribution grids using optimization and machine learning techniques”
Dr. Petros Aristidou, University of Leeds, United Kingdom
- 12:10 **Lunch**
- 13:00 **Keynote speaker 6:**
“Improving small-signal stability by controlling the internal stored energy of the MMC”
Dr. Gilbert Bergna-Díaz, SINTEF Energy Research
- 13:30 **Keynote speaker 7:**
“Increased situational awareness of power electronics dominated power systems: a concept for SSCI monitoring”
Vinay Sewdien MSc, TenneT TSO BV, Netherlands
- 14:00 **Keynote speaker 8:**
Grid forming control of renewable generation units for ensuring stable operation of converter dominated power systems
Prof. István Erlich, Universität Duisburg-Essen, Germany
- 14:30 **Keynote speaker 9:**
“Modelling and quantification of uncertainties in power systems: Probabilistic analysis using PowerFactory”
Dr. Johannes Ruess, DIgSILENT GmbH, Germany
- 15:00 **Close of conference**

7. Organization:

Conference Chairs

- Dr. Jose Luis Rueda Torres, Assistant Professor of Intelligent Electrical Power Grids – Delft University of Technology, The Netherlands

- Dr. Francisco Gonzalez-Longatt, Lecturer in Electrical Power Systems
- Loughborough University, United Kingdom

Local Organizing Committee: TU Delft IEEE Student Branch

General Secretary:

- Rishabh Bhandia (R.Bhandia@tudelft.nl)

8. Sponsors:

- Student Branch, IEEE TU-Delft

9. Registration.

- Please register via the following link:
https://docs.google.com/forms/d/e/1FAIpQLSc07WPALMn8Z_cGdInBSq_vwmQZRr4193WfKggoyYp1EIPZNEw/viewform?usp=sf_link
- Maximum number of participants is 100.
- Free registration. Places are available on a first come first served basis.

