



## Workshop on Software Tools for Power System Modelling and Analysis

**Date:** Friday, 11<sup>th</sup> October 2013

**Time:** 10.30 -13.00, followed by lunch

**Location:** \*\* Room 309a UCD Engineering and Materials Science Centre \*\*

*Please register interest ([federico.milano@ucd.ie](mailto:federico.milano@ucd.ie))*

### Programme:

#### **10:30 – 11:15 - Federico Milano, University College Dublin, Ireland**

Title: A Python-based Software for Power System Analysis

Abstract: The talk presents a power system analysis tool, called Dome, entirely based on Python scripting language as well as on public domain efficient C and Fortran libraries. Dome can currently solve power flow analysis, continuation power flow, time domain simulation including the quasi-steady-state analysis, small signal stability analysis and optimal power flow. The objectives of the talk are twofold: (i) to discuss the features that makes the Python language an adequate tool for research, massive numerical simulations and education; and (ii) to illustrate the architecture, the advanced features and the performances of the developed software tool through a variety of examples.

#### **11:15 – 11:30 – Coffee break**

#### **11:30 – 12:15 - Matthias Stifter, Austrian Institute of Technology, Austria**

Title: Modelling and (Co-)simulation of power systems, controls, components for analysing complex energy systems.

Abstract: The challenges of understanding and analysing future energy systems are the rise of complexity, due to the increasing number of participants, like distributed generation and different players (power system, controls, communication, market concepts). Existing domain specific modelling and simulation tools are restricted in their universality or scalability and therefore they need to be combined to use their individual strengths. This talk will cover the challenges of coupling simulation environments, namely: co-simulation methodologies and approaches from the theoretical point of view, interfaces from the technical point of view, components and behaviours for realistic modelling. Study cases will be presented to demonstrate the advantages of the co-simulation approach.

#### **12:15 – 13:00 - Manuel Marin, University of Perpignan, France**

Title: GPU-based techniques for power system analysis

Abstract: Simulation of electrical power network in real-time has been identified as a key step in implementing admission control policies, designed to protect the system from sudden changes in the load and generation profile. To be able to simulate in real-time, single-core machine model may be insufficient; thus, multi-core architectures, such as GPU, have been addressed. This talk presents the subject and partial results of a PhD thesis on this matter. Two separate investigations are detailed: the first one is about the acceleration of the backward-forward sweep algorithm using thread-level parallelism; the second is about uncertainty in input data, and a way to handle it through specific GPU arithmetic intrinsics.

#### **13:00 – 14:00 – Lunch**

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