Post-Doctoral position
Advanced nonlinear control for Microgrids

Subject: Development and implementation of advanced control laws for new generation power systems with high penetration of power electronic interfaced power sources.
Keywords: large-signal analysis, power systems, stability region, optimisation, multi-agent systems.
Duration: 12 months
Gross Salary: approximately 2700 € monthly.
Work place: SYCOMORE Team, L2S, CentraleSupélec, Paris-Saclay University.
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Description

Microgrids have attracted significant interest because of their advantages over classical power systems, due to the increasing number of renewable energy sources and controllable loads as electric vehicles. Naturally, microgrids are multi-level multi-time scale systems whose variables are affected by saturation. Those characteristics, together with the missing inertia due to the connection through electronic devices, impact microgrids stability more than classical power systems in case of power variations.

The successful postdoc will be expected to work on the utilization of different nonlinear control techniques to improve power systems stability analysis with a System of Systems approach. Contributions are expected to span both theory and the application domain. Main target is to improve power quality and enlarge the microgrids' stability regions with respect to power variations due to renewables. Either advances on classical control techniques as droop control or the development of new ones are of interest. AC or DC microgrids, and their interaction also in terms of grid forming or grid following control problems, are equally considered.

Preference will be given to candidates willing to investigate the different time scales of the systems, using for example singular perturbation theory, with the purpose to decouple both the dynamics as current and voltages or storage devices operating droop with respect to the ones used as energy reservoirs. Target is also to study the impact of saturation effects on the devices' interconnection performance.

Desired experience

1. PhD in control, possibly with experience in smart energy application domains, or viceversa;
2. Experience in the design and analysis of networked control systems;
3. Experience in publishing high quality research papers;
4. Familiarity with the SymPowerSystem software, or similar.

The position is available immediately and applications will be accepted until this position is filled. A National Security clearance is needed, and it can require approximately 2 months.

Contacts
Interested applicants should contact Houria Siguerdidjane and Alessio Iovine, and provide in PDF format (a) a CV, (b) the names of three or more references, (c) a one page description of their earlier work and (d) a one paragraph statement about their interest in the advertised position.