

Postdoctoral researcher in Advanced Centralized and Decentralized Control of Future Power Systems in H2020 RIA POSYTYF project

Key words: advanced/robust control, centralized/decentralized/structured implementations, power converters, renewable energy, inter-area oscillations, small-signal/transient stability

Context:

Ecole Centrale Nantes (ECN) is fully involved in Renewable Energies (RE) technologies such offshore and onshore wind, wave and solar. *Dynamics of Smart Grids* team of LS2N-ECN tackles some important thematic of control of modern power systems. In particular, this team has, from 2020 to 2023, the lead of the H2020 POSYTYF project (<https://posytyf-h2020.eu/>). This project is a Research and Innovation action of the EC focused on the development of an innovatory concept of Dynamic Virtual Power Plant (DVPP). The latter is supposed to allow an optimal portfolio of dispatchable and non dispatchable RE sources. Dynamics in the sense of stability assessment and control for RE sources participation to ancillary services are in the center of the project.

Research subjects:

DVPP are a collection of heterogeneous power generation sources (including solar, wind, bio, etc.) in a power park all with their own individual constraints (variable or dispatchable, limited in energy or power). One should investigate how to control and coordinate the individual devices in a DVPP and several DVPPs at the transmission grid level (so-called secondary level) subject to their individual constraints and so that their aggregated output to the grid provides ancillary services all temporal and spatial scales: from fast frequency response to voltage support, and from high-voltage transmission grids to low-voltage distribution systems. At this stage, we envision solutions that trade-off between optimality - when *centralized* approaches are taken - and resilience (i.e., maintaining a good level of performance in case of failure of one or more units of the DVPP) for *decentralized* approaches.

The candidate will:

- Develop and compare control methodologies
- Validate these controls in simulation
- Help power system researchers and engineers to implement and test the new controls in hardware-in-the loop (HIL) benchmark
- Present and publish the main findings at peer-reviewed conferences and in top journals

Competences needed:

The candidate should have background and experience in advanced (robust) automatic control. Both centralized and decentralized/structured controls will be investigated. Ideally, the candidate should have (up to 3 years) postdoctoral research experience. Please provide the names and contacts of 2 or 3 referees (if possible, not exclusively the PhD advisors).

Schedule:

Recruitment: asap

Duration : 12months with possibility of 2 years extension

Work will take place in ECN, Nantes-France.

Contact:

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