

Fiche de poste Type

Title:

Distributed Optimization and Stochastic Models for Energy Networks.

Type : post-doc

Work place : Inria Grenoble

Themes: Applied Mathematics, Statistics, Computer Science.

Project-Team: POLARIS

About Inria

« Established in 1967, Inria is the only public research body fully dedicated to computational sciences.

Combining computer sciences with mathematics, Inria's 3,500 researchers strive to invent the digital technologies of the future. Educated at leading international universities, they creatively integrate basic research with applied research and dedicate themselves to solving real problems, collaborating with the main players in public and private research in France and abroad and transferring the fruits of their work to innovative companies.

The researchers at Inria published over 4,450 articles in 2012. They are behind over 250 active patents and 112 start-ups. The 180 project teams are distributed in eight research centers located throughout France. »

Mission

This post-doc will be financed by the European FP7 project Quanticol. The main objective will be to participate to the development of modeling tools and optimization techniques applied to one of the case-study of our team (smart-grid, networks, distributed systems). This project relies on tools from stochastic modeling, optimization, formal languages and verification techniques. One of the key aspect of the project is the use of fluid or mean-field approximation to avoid the traditional state-space explosion inherent to large stochastic models.

Description of the scientific objectives

The candidate will contribute to the theoretical foundation of the project as well as to the case-studies. A particular attention will be given to the self-organisation of systems into multiple scales (spatial, temporal, organisational) and to uncertainties inherent in socio-technical systems. This involves tools from * stochastic modeling and optimization * fluid approximation * game theory and distributed control

The methodological approach is to build theoretical models based on practical problems. In particular, we identify two main research directions:

* Storage management and distributed control in electrical networks where there is a high share of renewable energy sources and hence many uncertainties.

* Mechanism design and pricing incentives in energy markets

The case studies will be designed and tested with our industrial partners, including Schneider Electric.

Profile of candidates

Applicants must have a PhD in Computer Science, Mathematics or Statistics. A strong knowledge in stochastic modeling, optimization or in one of the case study is necessary. Applicants should be able to work efficiently in a research team.

Duration

Duration : 12 months, starting anytime from now.

Informations:

Scientific supervisors:

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It is advised to contact Nicolas Gast or Bruno Gaujal for more information on the research project.