L'équipe organisatrice : Anne Barros (correspondante équipe SR), Marija Jankovic (correspondante séminaire des doctorants à mi-thèse), Guillaume Lamé (correspondant équipe MO), Yannick Perez (correspondant équipe ED), François Cluzel (correspondant équipe IC, et coordination globale), Carole Stoll (communication).

Jeudi 10 juin 2021

de 14h à 16h40 sur Team

Séminaire des doctorants à mi-thèse

Les séminaires des doctorants à mi-thèse du LGI ont lieu 3 fois par an. Chaque doctorant ou doctorante qui atteint le milieu de la durée de sa thèse est invité(e) à présenter ses travaux devant l'ensemble du laboratoire. Pour l'occasion, le candidat propose un jury composé (tant que faire se peut) de deux seniors (un enseignant-chercheur de la même équipe et un d'une équipe différente), et d'un junior (un autre doctorant).
Le format est le suivant :
- 20 minutes de présentation
- 5 minutes de retours et questions pour chaque membre du jury
- 5 minutes de questions-réponses avec l'ensemble de l'audience

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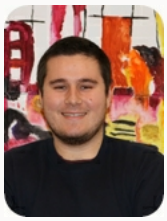
14h00 - Arthur LYNCH

The stakes of nuclear planning optimization in electric systems operation with renewable energy

Jury:
Vincent Rious, Professeur à CentraleSupélec
Oualid Jouini, Professeur, équipe Management Opérationnel
Marc-Olivier Metais, Doctorant, équipe Economie Durable



Arthur Lynch is a PhD candidate at CentraleSupélec and the French Alternative Energies and Atomic Energy Commission (CEA). He graduated in Economics-Financial Engineering from the Université Paris-Dauphine and received his master Degree on Energy Economics from the Université Paris-Saclay, IFP School and INSTN. Since 2019, he has joined the Laboratoire de Génie Industriel (LGI) from CentraleSupélec and the Institute for Techno-Economics of Energy Systems (I-Tésé), contributing to the research topics of nuclear flexibility and economic competitiveness, as well as renewable energy integration in electric systems.

Abstract :

The recent development of variable renewable technologies in electric systems calls for prospective work regarding, among others, the future optimal capacity mix as well as its related carbon footprint, security of supply, and overall costs. In the context of diminishing and fickle residual electric demand, each generating technology's operational flexibility will partly determine whether they shall participate in future decarbonized electric systems, and nuclear technology is no exception. Hence, assessing the available nuclear flexibility is crucial to evaluating nuclear power's economic and technical interactions and the newly-built renewables capacities. This paper identifies the underlying physical mechanisms that frame this technology's flexibility and operations and focuses its analysis on nuclear planning optimization, a structural characteristic of nuclear fleets. We develop a method to simulate this optimization to reflect how plants managers maximize their plants' availability during peak-demand periods. We compare two simulation hypotheses, one where the fleet's planning is optimized and another where the fleet's availability is considered constant, a standard practice in the energy systems modeling literature. The paper conducts a sensitivity analysis highlighting the links between the fleet's planning optimization, the relative share of nuclear and renewables in the capacity mix, and the simulation models' results. We find that modeling the nuclear fleet's optimization is of greater importance as the relative share of nuclear in the capacity mix is high. The planning's importance holds as renewables' installed capacities heighten, as the residual demand level decreases with higher volatility. Ultimately, this paper aims to highlight the potential benefits of modeling the fleet's planning optimization in simplified low-carbon electric systems with a significant share of renewable energy.

14h40 - Eliane HORSCHUTZ NEMOTO

Sustainability assessment of the deployment of automated minibuses in urban mobility of European cities.

Jury:
Jakob Puchinger, Professeur, équipe Management Opérationnel
Flore Vallet, Professeur, équipe Economie Durable
Tjark Gall, Doctorant, équipe Ingénierie de la Conception

Eliane Horschutz Nemoto is Associate Researcher at Pforzheim University and PhD candidate at CentraleSupélec. She graduated in Environmental Management from the University of São Paulo and received her Master Degree on Sustainable Territorial Development from the Università degli Studi di Padova, Katholieke Universiteit Leuven & Université Paris Panthéon-Sorbonne. Since 2018, she joined the AVENUE project, contributing to the research topics of autonomous vehicles, sustainability assessment, stakeholder analysis and the future mobility.

Abstract:

The deployment of shared automated electric vehicles are the object of study as a potential mode of transport to support future mobility transitions and cities to achieve sustainable mobility goals. However, the impacts of automated vehicles remain uncertain and more empirical data and assessments based on real-world are required. This paper performs a sustainability assessment of the current deployment of automated minibuses integrated into the public transport of European cities. Further, it ponders how the automated minibuses can contribute to sustainable urban mobility planning and strategies envisioning future mobility systems. The assessment is conducted by applying a set of indicators to measure the performance and impacts of the automated minibuses considering the mobility multi-dimensions: social, environmental, economic, governance and technical system. The sustainability assessment builds upon five case studies from AVENUE project, a European project deploying automated minibuses to enhance the public transport of cities. A mobility radar reveals the strengths and weak points regarding the current performance of the automated minibuses and it set goals for in the short term (3 to 5 years). The study points the key elements for the deployment of the automated minibuses to endorse sustainability urban mobility planning and strategies.

15h20 - Fatima-Ezzahra ACHAMRAH

Solving complex decision support models for managing shared physical assets in collaborative supply chains

Jury:
Bernard Yannou, Professeur, équipe Ingénierie de la Conception
Jakob Puchinger, Professeur, équipe Management Opérationnel
Ouidad Benhlima, Doctorante, équipe Management Opérationnel

Fatima Ezzahra Achamrah is a Ph.D. Student in Industrial Engineering at Paris Saclay University, CentraleSupelec, LGI. She works also as a R&D Engineer at Ecole Centrale Casablanca. She is a former R&D Engineer at GE. She received (2016) an engineering degree in Process engineering. Her thesis subject is on a development of decision support models for sharing physical assets in and between supply chains. Her research interests are modelling and simulation of industrial and complex systems.

Abstract:

Companies in different industries have to deal with high manufacturing and logistics costs, fierce competition, volatile demands, and have to guarantee customer satisfaction and environment sustainability. A such business environment is, therefore, anything but—VUCA (Volatile, Uncertain, Complex and Ambiguous). This requires from compagnies a continuous search for ground-breaking practices and shifting towards new inter-organisational configurations based on collaboration and sharing of so-called physical assets which cover machines, warehouses, inventories, transportation means and returnable transport items. This practice became of a such interest in the recent years thanks to the emergence of cyber-physical systems, physical internet paradigm and recently/currently with COVID-19 crisis which is the black swan event which has led to a shut of down of many companies or even exposed the vulnerabilities of others, especially those relying on classical management models. Compagnies yet need to learn how to play in a world of shared assets and seize new opportunities to grow their businesses and enhance their margins. Whereas much has been written about joint planning, joint decision-making, joint problem solving, sharing information and knowledge in the context of collaboration, the literature on sharing and pooling physical assets remains relatively in its infancy. A closer look at the literature reveals that there is a need for efficient tools for managing such shared assets. The mean objective of this research project is the development of decision support models for managing shared physical assets in and between supply chains. We focus more specifically on sharing of inventories, reusable transport items (RTI) that flow in a closed loop, and machines. To conduct this research, we start from practical case studies, describing the reality of sharing physical assets. We are particularly interested in the distribution of fashion items and spare parts for inventories, in the management of RTI in the automotive and agri-food industries while exploiting the physical internet paradigm, and in the scheduling of machines with respect to the preferences of the involved actors. We investigate the related literature to analyse existing works and clearly highlight our contributions. We develop for each shared asset specific mathematical models, and original resolution methods based on the hybridisation of mathematical modelling, co-evolutionary algorithms and deep reinforcement learning. Experiments are conducted to evaluate the relevance of the proposed models, the performance of the resolution approach, and to analyse the results in order to produce relevant recommendations.

16h00 - Rémi LAUVERGNE

Integration of electric vehicles into transmission grids : a case study in France in 2040

Jury:
Isabelle Nicolaï, Professeur, équipe Economie Durable
François Cluzel, Maître de Conférences, équipe Ingénierie de la Conception
Arthur Lynch, Doctorant, équipe Economie Durable

Rémi Lauvergne received the M.Sc. degree from CentraleSupelec, France in 2018. Since the fall of 2019, he has been pursuing a PhD degree, at LGI, CentraleSupelec, in collaboration with RTE. His PhD topic concerns electric vehicles recharge modelling, and their interactions with power systems.

Abstract:

Electric vehicles are currently seen as an opportunity to reduce greenhouse gases and other local polluting emissions of the transport sector, which is nowadays mainly reliant on carbon-intensive fuels. As a result, many governments are incentivizing electric vehicle use. The prospective integration of a large fleet of electric vehicles between 2020 and 2050 could be seen as both a challenge and as an opportunity for power systems, and thus needs to be further studied. Electric vehicle recharge could interact with several aspects of the electricity sector, in this work, we focus on the interaction between electric vehicle recharge and the electricity supply-demand adequacy at the hourly time scale. This paper aims at describing a methodology to study the economic impacts of the charge of electric vehicles according to several connection behaviors of EV owners and the range of recharge modes available. Subsequently, this framework is applied to a case study of high penetration of electric vehicles in France at the 2040 time horizon

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A vos agendas

Jeudi 24 juin, 14h : séminaire des doctorants

Past scientific seminars: Here
Activity Reports: Here
Previous Newsletters: Here