Postdoc position on
Network Control Systems & Power Electronics Technologies Applied to Smart Grids

as a part of the Collaborative Research "Interdisciplinary Research Activities in Electric Smart Grids", supported by FAPESP (São Paulo Research Foundation, Brazil)

Home Institution: School of Electrical and Computer Engineering, University of Campinas - FEEC/UNICAMP (https://www.fee.unicamp.br/) (Campinas, SP, Brazil).

Supervisor: Prof. Dr. João Bosco Ribeiro do Val

Apply no later than June 5, 2022

LabREI – SmartGrid Laboratory at FEEC/UNICAMP seeks for motivated and well qualified young researchers for a postdoc position in Network Control Systems & Power Electronics Technologies Applied to Smart Grids (https://www.fee.unicamp.br/lab-rei).

The central theme of this project is the use of network control systems (NCS) techniques applied to an up-to-date laboratory energy system. It has the underlying structure of communication channels and is suitably equipped for the modern functions of a smart grid. The objective is to promote techniques that incorporate the NCS problem regarding communication restrictions imposed by communication channels with bandwidth limitations, indefinite delays, and data losses due to integrity or annihilation. The project accounts for a comprehensive control problem that involves system stabilization, state estimation, and the control itself. The main aim is to reach an adequate level of reliability and performance on a power system with multiple distributed power electronics converters. The control structure may adopt a specific degree of distribution, ranging from centralized to a highly distributed architecture, imposing different commitments on the underlying resources. On the one hand, levels of decentralization impose different capacity requirements on the channels and, on the other hand, different demands on decision-making capacity and autonomy to distributed agents. This proposal aims to achieve a duly approach to existing techniques for application in the laboratory plant, which, when assimilated, will allow programs for the use together with unique techniques with potential application in larger smart grid systems.

The main activities of the PD fellow will be related to the development of energy management techniques, aiming at the integration of renewable energy sources and energy storage systems in smart grids. The researcher should integrate diverse information and control signals from agents distributed through networks such as smart meters, power converters, and data concentrators. Computer simulations and experimental activities are the expected means to validate the devised methodologies.

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The expected activities are associated to the Collaborative Research "Interdisciplinary Research Activities in Electric Smart Grids", supported by FAPESP (São Paulo Research Foundation), which is developed at the School of Electrical and Computer Engineering, University of Campinas, Campinas, Brazil, in collaboration with the Institute of Science and Technology of Sorocaba (ICTS/UNESP - http://www.sorocaba.unesp.br).

Required Skills: Candidates must have excellent skills and experience in: power electronics (topologies, control, modulation, etc.); modelling and control of distributed generators and energy source systems; simulation tools for electrical circuits, power electronics and control (PSIM, Plecs, Matlab/Simulink); software (digital signal processing, programming of microcontrollers, FPGAs and DSPs, C/C++, Python); power electronics hardware development (topologies, protections, interfaces, lay-out, thermal management, etc.). Additionally, fluency in English is mandatory and basic communication skills in Portuguese are desired.

How to Apply: Applications must be made **exclusively by e-mail until June 5, 2022**. Applications should be directed to Prof. João Bosco Ribeiro do Val (jbosco@unicamp.br), with copy to Prof. José Antenor Pomilio (antenor@unicamp.br), using the e-mail subject as "Application for PD_2022_candidate name".

For application, candidates are required to provide as pdf attached documents: (i) Motivation Letter, emphasizing the experience on the required skills (up to 2 pages), (ii) Two reference letters; (iii) Curriculum Vitae with published articles and evidencing the abilities to conduce the project (up to 5 pages); (iv) PhD diploma or approval certificate.

Selection: The selection will be made primarily based on: (1) the curriculum of the candidates and on the motivation letter; (2) by a personal or video conference interview with selected candidates, where the abilities in the issues will be verified and other aspects may be discussed, and (3) publications in high quality journals and conferences.

This opportunity is open to candidates of any nationalities. The selected candidate will receive a **FAPESP's Post-Doctoral fellowship** in the amount of R$ 8.479,20 monthly and a research contingency fund, equivalent to 15% of the annual value of the fellowship which should be spent in items directly related to the research activity. Transportation and installation support will also be provided to candidates moving from cities farther than 350 km.

Duration: 12 months (estimated from July 1st, 2022)

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