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Research outputs

Locating High-Impedance Faults in DC Microgrid Clusters Using Support Vector Machines

Bayati, N., Balouji, E., Baghaee, H. R., Hajizadeh, A., Soltani, M., Lin, Z. & Savaghebi, M., 15. Feb 2022, In: Applied Energy. 308, 11 p., 118338.

Distributed optimal voltage control in islanded microgrids

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A Reduced-Order Generalized Proportional Integral Observer-based Resonant Super-twisting Sliding Mode Control for Grid-Connected Power Converters

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A Two-layer Control Scheme Based on P-V Droop Characteristic for Accurate Power Sharing and Voltage Regulation in DC Microgrids

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کینومراه و ژاتلو هفاضا تالکشم رب هبلغ یارب ویسپ رتلیف و یرتاب هنیه ی رادرب هرهب و هزادنا ،ناکم نییعت کییاتلووتف یاه هناماس یالاب ذوفن بیرض اب قرب عزیزوت هکبش کی رد

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Hooshyar, H., Heydari, H., Savaghebi, M., Sharifi, R. & Shabazi, B., Jun 2008, *Proceedings of 3rd IEEE Conference on Industrial Electronics and Applications*. IEEE, 4 p.

Investigation of Transformer Cooling Improvement Utilizing Online Monitoring System

Shabazi, B., Savaghebi, M., Ashouri, M. & Vadiati, M., Jun 2008, *Proceedings of 3rd IEEE Conference on Industrial Electronics and Applications*. IEEE, 5 p.

Harmonics consideration of a resistive type superconducting fault current limiter

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Proper dimension of HTS material for a resistive type SFCL in an 11kV distribution system

Heydari, H., Hooshyar, H., Savaghebi, M. & Sharifi, R., 1. Dec 2007, *IEEE PES PowerAfrica 2007 Conference and Exposition, PowerAfrica*. 4498074. (IEEE PES PowerAfrica 2007 Conference and Exposition, PowerAfrica).

Synchronous Generator: Past, Present and Future

Hooshyar, H., Savaghebi, M. & Vahedi, A., Sep 2007, *Proceedings of Africon 2007 Conference*. IEEE, 7 p.

Press/Media

Energi Fyn deler atter penge ud

Mehdi Savaghebi
29/04/2019
1 Media contribution

Energi Fyns to fonde giver millioner til 21 fynske projekter

Mehdi Savaghebi
25/04/2019
1 Media contribution

Historisk bevilling bag enestående forskning på SDU

Mehdi Savaghebi

03/12/2019
1 Media contribution

Historisk bevilling fra Energi Fyns Udviklingsfond skaber unik forskning på SDU
Mehdi Savaghebi
29/10/2019
1 Media contribution

Teaching and supervision

Control of Power-Electronic Converters in Wind Turbines for Harmonic Compensation and Grid Support

Descriptions

Erasmus Exchange MSc Project from KU Leuven, Belgium
Student: Vincent Bintein

Description The aim of the thesis is to eliminate the voltage/current harmonics and support the grid (e.g. reactive power compensation) by the wind turbines. By having a good control strategy for the power converters in wind turbines, remaining capacity of these converters after supplying the generated energy to the grid can be used to reach these targets.

Information

Period 01/02/2019 → 30/06/2019
Target group Master
ECTS credits 20 ECTS
Subject Director Savaghebi, M.
Managing organisational unit SDU Electrical Engineering

Teaching and supervision: Supervision

Designing Passive Harmonic Filter for Wind Farms

Descriptions

Description As part of grid code and design requirements any renewable energy power plant (solar, wind etc.) connecting to the public grid must comply with the harmonic limits set by the TSO. As a large number of projects are being connected with large cable networks, inter array cables (IAC) and/or long export cables (EXC) resonances in the IAC system or between the renewable energy power plant and the public grid might cause challenges which needs to be solved with passive harmonic filters.
Choosing, designing and tuning a passive harmonic filter is an iterative time-consuming process which could maybe be completely or partly automated to make it easier and faster to arrive at a good filter solution for a specific site/system.

Information

Period 01/11/2021 → 31/03/2022
Target group Bachelor
Subject Director Savaghebi, M.
Managing organisational unit SDU Electrical Engineering

Teaching and supervision: Supervision

Dynamic Rating of Three-Core XLPE Submarine Cables for Offshore Wind Farms

Descriptions

Final B.Eng. Project in Electrical Energy Technology
Students: Thomas V. M. Nielsen & Simon Jakobsen
Description This thesis is the product of five month of intensive study in rating of submarine cables from wind based load profiles. The study was performed at the University of Southern Denmark, Odense, by two students as a part of the education Electrical Power Engineering at the 7th semester. The problem statement is prepared on demand from the cooperating companies, Energinet Eltransmission A/S and VattenfallWind Power A/S, where the students have been working during an internship.

Information

Period 01/09/2018 → 31/01/2019
Target group Bachelor
Subject Director Savaghebi, M.
Managing organisational unit SDU Electrical Engineering

Teaching and supervision: Supervision

Electric Power Quality

Descriptions

The quality of electric power is an important concern for both electric power utilities and customers. This course will provide the students with an understanding of the power quality concept, main power quality problems, indices and impacts as well as devices and methods for power quality enhancement. The course focus is on distribution networks and the impact of both generation and consumption sides on power quality will be discussed. About 40%-50% of the class time will be dedicated to simulation exercise mainly in MATLAB/Simulink.

Description The main topics are as follows:
Short-term voltage variations (sag, swells and interruptions)
Long-term voltage variations (flicker, over-voltage and under-voltage)
Harmonics and resonances
Unbalances
Transient over-voltages
Power quality enhancement tools and methods (active filter, passive filter, etc.)
Power quality monitoring and standards
Distributed/renewable generation and power quality

Information

Period 01/09/2020 → ...
Target group Bachelor
ECTS credits 5,0 ECTS
Subject Director Savaghebi, M.
Managing organisational unit SDU Electrical Engineering

Teaching and supervision: Teaching

Grid Integration of Renewable Energy Systems

Descriptions

Renewable energy systems (RES) are gaining increasing importance throughout the world. Proliferation of RES in electrical grids has led to new opportunities and challenges in control, stability, protection, power quality and operation of power systems. This course will provide the students with an understanding of the main concepts on modelling, control, and simulation of RES and their grid integration. A part of the lectures will be dedicated to simulation exercises using MATLAB/Simulink and/or DIgSILENT PowerFactory and invited industrial/academic lectures.

Description The main topics are as follows:
Photovoltaic energy systems
Wind turbines and onshore/offshore wind farms
Energy storage systems
Microgrids
Power electronic and control of RES
Power quality, stability and protection challenges of RES integration
Grid codes and standards for the interconnection of RES to electrical grids

Information

Period 01/09/2021 → ...
Target group Bachelor
ECTS credits 5,0 ECTS
Subject Director Savaghebi, M.
Managing organisational unit SDU Electrical Engineering

Teaching and supervision: Teaching

Large-disturbance voltage stability in power systems with high penetration of renewable energy

Descriptions

Description The transmission system operator (TSO), must ensure a stable power grid under large voltage disturbances, such as a solid three phased fault. However, defining the stability of a power grid is a complex task, as the power flow within the power grid has changed through the years. The reason of this, is due to a higher level of renewable energy sources with power electronics interfaced devices, and flow from HVDC connections.
Hereby a problem statement can be defined as following:
The purpose of this project is to investigate different large voltage disturbance criteria within the modern power grid.

Information

Period 01/02/2020 → 30/06/2020
Target group Master
ECTS credits 30 ECTS
Subject Director Savaghebi, M.
Managing organisational unit SDU Electrical Engineering

Teaching and supervision: Supervision

Power Electronic Systems

Descriptions

Description

The course aims to provide an overview and understanding of a range of important power electronic applications covering various power system and renewable energy topics. The lectures are planned in 12 weeks. Almost 40% of the class time is dedicated to simulation exercises (using MATLAB/Simulink and DIgSILENT PowerFactory) and invited lectures from industry and academia. About 10% of the time is planned for students' presentations on a topic in the field, proposed by them and approved by the class teacher.

Assessment is based on a final oral exam with an external co-examiner according to the 7-point grading system. Information, materials and announcements related to the course are available in SDU Itslearning system. The following topics are covered in this course: Overview of Power Electronic Systems, Harmonics and Active Power Filters, Distributed Generation and Microgrid, Photovoltaic Systems and Wind Turbines.

Information

Period 01/02/2019 → ...

Target group Master

ECTS credits 5,0 ECTS

Subject Director Savaghebi, M.

Managing organisational unit SDU Electrical Engineering

Teaching and supervision: Teaching

Power System Modelling and Analysis

Descriptions

This course will provide the students with a basic understanding of the fundamental concepts in modelling, analysis, and simulation of three-phase electrical networks. The main subjects are around generation and transmission of electrical power. Basic concepts of protection and power quality in electrical grids will also be presented. The focus of the course will be on traditional power networks; however, modern electrical grids (so-called smart grids) will also be introduced. About 40%-50% of the class time will be dedicated to simulation exercises (using MATLAB/Simulink and DIgSILENT PowerFactory) and invited industrial/academic lectures.

Description

The main topics are as follows:

- Introduction to power systems
- Powers in single- and three-phase systems
- Power factor and power factor correction
- Per-phase analysis of three-phase circuits
- Per-unit system
- Generator and transformer modelling
- Transmission line modelling
- Power electronic applications in power systems

Information

Period 01/09/2021 → ...

Target group Bachelor

ECTS credits 5,0 ECTS

Subject Director Savaghebi, M.

Managing organisational unit SDU Electrical Engineering

Teaching and supervision: Teaching

Reliability Analysis and Design of Northern Fyn Medium Voltage Grid

Descriptions

This project focuses on analyzing the current status of electrical grid, on the medium voltage level, 10kV, on the northern part of Fyn. The reason for the choice of area to be examined can be summed up in three points.

The first reason is that it is a mixture of rural areas, large greenhouses, cities, summer/vacation housing as well as industrial sites. This indicates that an area of this size, in the coming years will see an increase in the demand for electricity, not only for electrical cars, but also for heat pumps. The second reason is that the utilities company responsible for the electrical grid, Vores Elnet, has already identified the area as challenged regarding the medium voltage grid. This became noticeably clear during the very cold month of February 2021 where high power demands and radials with very long cables almost resulted in both overloaded transformers and poor voltage quality together with severe challenges to maintaining N-1 backup capacity.

The third reason is derived from the two first points, and the political decision to bring down CO₂ by 70% by 2030 on a national level. As a result of this, the already strained grid and increase in power demand will require identification of problem zones and a plan on how and where to reinforce the existing grid

Information

Period	01/09/2021 → 31/01/2022
Target group	Bachelor
Subject Director	Savaghebi, M.
Managing organisational unit	SDU Electrical Engineering

Teaching and supervision: Supervision

Educational practice - Basis / values

University of Southern Denmark is recognized for advanced and efficient learning model based on Problem-Based Learning (PBL) and Active Teaching/Learning. It is problem-based project-oriented model that gives the students a more independent learning which favors interdisciplinarity and direct participation through team works to solve real life problems. I have had the privilege to practice this learning model both in teaching and supervision of students.

Since I like teaching, I try to make the learning process also enjoyable. I allow the students to be more proactive and more attentive by making them think to provide new solutions and improvements to the field of study. I also spent enough time preparing high quality, and engaging presentation slides for my students so they can be prepared anytime in the case they have to give a research presentation or even being ready for presenting a paper in an international conference.

Formal pedagogical training

Training for teaching and supervision has been obtained by attendance in the following courses:

- Problem-Based Learning-The AAU Model Course, Aalborg University Fall 2015.
- Seminar for PhD Supervisors, Aalborg University, 2015.
- Basic Course in Pedagogy for University Teachers, Aalborg University, Spring 2016.
- University Teaching Day, Aalborg University, 2016.
- Oral Examination in Higher Education in Denmark, University of Southern Denmark, Fall 2018.
- Setting Up Your Course in Blackboard - an online course, University of Southern Denmark, Spring 2019.

Other activities related to teaching and teaching development

- Lecturer and Coordinator of Industrial/PhD Course on Power Quality in Microgrids, (2015, 2016, 2017 and 2019)

For 2014-2018, I worked as a Postdoc Fellow and then Associate Professor at the Department of Energy Technology, Aalborg University. I have coordinated Industrial/PhD Course on Power Quality in Microgrids for two years. In addition, I was actively involved in this course as a lecturer and also prepared the lab exercises. I was a guest lecturer for this course in 2019.