



IEEE Workshop on Representations of Power Electronics for Grid Dynamic Studies



DEPARTMENT OF ENERGY TECHNOLOGY
AALBORG UNIVERSITY



REPEPS
REliable Power Electronic based Power System



**IEEE POWER
ELECTRONICS SOCIETY**
Powering a Sustainable Future



IEEE

Information

WIFI

WLAN: **AAU-1-DAY**

Password: **tux68mite**

10:30~11:00

Coffee Break

12:30~13:30

Lunch & AAU Lab Tour

Group **1~3** will have AAU Lab Tour at 12:30~13:00 and lunch at 13:00~13:30.

Group **4~6** will have lunch at 12:30~13:00 and AAU Lab Tour at 13:00~13:30.

15:00~15:30

Coffee Break

16:30~17:30

Panel Discussion: Challenges on Dynamic Analysis of 100% Converter-Based Power Systems

17:30

End of Workshop

Harmonic Stability in Power Electronic based Power Systems

Presented by:

Prof. Xiongfei Wang from Aalborg University, Denmark

Xiongfei Wang is Professor and Program Leader for Electronic Grid Infrastructure at the Department of Energy Technology, Aalborg University, Denmark. His research interests include modeling and control of grid-interactive converters, stability of power-electronic-based power systems, harmonic analysis and mitigation. In 2016, he was selected into Aalborg University Strategic Talent Management Program. He received four IEEE prized paper awards in both Transactions and conferences, the outstanding reviewer award of IEEE Transactions on Power Electronics in 2017, and the IEEE PELS Richard M. Bass Outstanding Young Power Electronics Engineer Award in 2018. He serves as the Associate Editor for the IEEE Transactions on Power Electronics, the IEEE Transactions on Industry Applications, and the IEEE JESTPE. He was the Technical Program Chair for IEEE eT&D 2017.

Small-signal Stability Studies in Offshore Wind Power Plants

Presented by:

Dr. Łukasz Hubert Kocewiak from Ørsted, Denmark

Łukasz Hubert Kocewiak holds BSc and MSc degrees in electrical engineering from Warsaw University of Technology as well as PhD degree from Aalborg University. Currently he is with Ørsted Wind Power and is working as R&D manager and senior power system engineer on development of electrical infrastructure in large offshore wind power plants.

The main direction of his research is related to harmonics and nonlinear dynamics in power electronics and power systems, especially focused on wind power generation units. He is the author/co-author of more than 60 publications. He is member of various working groups/activities within Cigré, IEEE, and IEC.

System Modelling for Offshore Wind Power Plants within TenneT

Presented by:

Dr. Christoph Buchhagen from TenneT, Germany

Christoph Buchhagen studied Electrical Engineering at Leibniz Universität Hannover in Germany and received his Diploma degree in 2009. Till 2013 he worked as a research assistant at the same university and graduated in 2015. Since 2013 he is with TenneT TSO GmbH in the Asset Management Department where he is working for the connection of offshore wind farms, mainly by using VSC HVDC systems. His work is mainly focused on system studies, fault analysis and harmonic phenomena.

Grid Impacts and Technical Challenges for the Bulk Power System Integrating with Large Renewable Energy

Presented by:

Prof. Yongning Chi from China EPRI, China

Yongning Chi received Master degree from the College of Electrical Engineering, Shandong University, Jinan, China, and Ph.D. degree from China Electric Power Research Institute, Beijing. He is with China Electric Power Research Institute as a Chief Engineer of the Renewable Energy Research Center. He is the Secretary of IEC SC 8A “Grid Integration of renewable energy generation,” Expert Member of IEA GIVAR Advisory Group, and also a member of CIGRE. His research interests are on modeling, control, and integration analysis of renewable energy generation. He was also responsible for formulating the Chinese Wind Power & Solar Power (PV) grid codes. He leads several national-level research projects (973, 863 plan) regarding renewable energy grid integration; more than 50 papers are published in the area of renewable energy grid integration.

Energinet's Experience for the Power Electronics Converter Related Transient Studies

Presented by:

Dr. Jun Bum Kwon from Energinet, Denmark

Jun Bum Kwon received the B.S. and M.S. degrees in control and instrumentation engineering from Seoul National University of Science and Technology, Seoul, in 2007 and 2010, respectively. He also finished the Ph.D. degree from Aalborg University in 2017. He was a Research Engineer with the HVDC Research and Development Center, LS Industrial Systems, South Korea, from 2010 to 2013. He is currently working in Energinet as a grid analyst since 2016. His research interests include harmonic analysis, insulation coordination design, modeling of power converters and transient analysis of power converters in transmission grid.

A Practical Sub-synchronous Oscillation in an Offshore Wind Power Plant: Modeling, Eigenvalue-based Analysis Approach and Validation

Presented by:

Dr. Lei Shuai from Siemens Gamesa, Denmark

Lei Shuai has been working in Siemens Gamesa Renewable Energy for 8 years. Currently he is the solution owner for grid compliance for offshore platforms, and leading power system study in harmonics and stability.

Impedance Based Analysis of Interconnected Power Electronics Systems: the Impedance Operator and Partition Points

Presented by:

Prof. Marta Molinas from NTNU, Norway

Marta Molinas received the Doctor of Engineering degree from the Tokyo Institute of Technology, Tokyo, Japan, in 2000. She was a Guest Researcher with the University of Padova, Padova, Italy, during 1998. From 2008-2014 she has been professor at the Department of Electric Power Engineering at NTNU and since 2014 Professor at the Department of Engineering Cybernetics, NTNU. Her research interests include stability of power electronics systems, harmonics and non-stationary signals from the human and the machine. She is Editor for the IEEE Trans. on Energy Conversion and IEEE JESTPE. She is also Ass. Editor for the IEEE PELS and the IEEE TIE.

Grid-forming Power Electronics Systems: Control Implementation and Stability Challenges

Presented by:

Prof. Lennart Harnefors from ABB/KTH, Sweden

Lennart Harnefors received the M.Sc., Licentiate, and Ph.D. degrees in electrical engineering from the Royal Institute of Technology (KTH), Stockholm, Sweden, and the Docent (D.Sc.) degree in industrial automation from Lund University, Lund, Sweden, in 1993, 1995, 1997, and 2000, respectively. Between 1994 and 2005, he was with Mälardalen University, Västerås, Sweden, from 2001 as a Professor of electrical engineering. Between 2001 and 2005, he was visiting Professor of electrical drives with the Chalmers University of Technology, Goteborg, Sweden. Since 2005, he has been with ABB, where he is currently a Senior Principal Scientist in Corporate Research, Västerås, Sweden. He is, in addition, a part time Adjunct Professor of power electronics with KTH. His research interests include control and dynamic analysis of power electronic systems, particularly grid-connected converters, ac drives, and wide-bandgap-transistor switching circuits. Dr. Harnefors is an IEEE Fellow, an Associate Editor for the IEEE Tran. on Industrial Electronics and the IET Electric Power Applications.

Modeling and Simulation of Complex Converters

Presented by:

Dr. Min Luo from Plexim, Switzerland

Min Luo received his PhD degree from Swiss Federal Institute of Technology in Lausanne. He has been with Plexim GmbH, Switzerland, as power electronics application engineer since 2012 and working on the library components and technical support for the simulation tool PLECS. His current research interests include dynamic modelling of magnetic components and real-time HIL simulation of power converters.

Impact of VSC on Power System Voltage Small-Signal Stability

Presented by:

Mr. Yin Sun from DNV GL Group, the Netherlands

Yin Sun holds a MSc in Sustainable Energy Technology (2010) and is currently Senior Researcher at DNV GL Group Technology Research, Arnhem, the Netherlands. Yin Sun has been working with KEMA (predecessor of DNV GL) since 2010 as a power system analysis consultant in the power grid design/analysis, engineering, and commissioning support. Since 2014, he became a part-time PhD candidate at Electrical Energy System Group, Eindhoven University of Technology. His research topic focuses on the stability of power electronics dominant grid, especially the harmonic stability induced by complex converter control interaction. Yin Sun is also a technical expert in the CIGRE C4. B4. JW38 (Network Harmonic Calculation) and IEC SC8A (renewable grid compliance).

Online Measurement and PHIL Emulation of Power System Impedance to Test Adaptively Controlled Inverters

Presented by:

Dr. Tuomas Messo from Tampere University, Finland

Tuomas Messo completed his PhD degrees at Tampere University of Technology, Tampere, Finland in 2014. In 2016 he was appointed as an Assistant Professor in the field of power electronics.

He is currently working at Tampere University, Department of Electrical Energy Engineering, where he carries out lecturing, research and supervision of electrical engineering students of all degrees.

His main research interests include dynamic modeling of power converters in renewable energy applications and smart grids, impedance-based stability analysis, frequency-domain measurements and adaptive control.

Challenges in Real-time Simulation of Power Electronics Enabled Power Systems

Presented by:

Mr. Adrien Genić from Typhoon HIL, USA

Adrien Genic finished his bachelor studies in field of Industrial Electronics in 2010. In 2011 he got a MSc degree in field of Computer Science and Algorithms. He received both degrees at Faculty of Technical Sciences in Novi Sad, Serbia. In 2012 he spent 9 months at Massachusetts Institute of Technology, specializing in Power Electronics simulations. He is one of the first employees of Typhoon HIL, started as hardware development engineer and moved to modelling team. Currently he is leading the modelling group in Typhoon HIL. He is an author and co- author on several papers published in field of Real-time simulation of Power electronics and microgrids.

Panel Discussion:

Challenges on Dynamic Analysis of 100% Converter-Based Power Systems



*Advancing Technology
for Humanity*