UNIVERSITY OF KWAZULU-NATAL

ESKOM CENTRE OF EXCELLENCE HVDC ENGINEERING

Presents

Dr Grain Philip Adam

Senior Researcher, Technology & Innovation Center,
Institute of Energy & Environment, Dept. of Electronic & Electrical Engineering
University of Strathclyde, Glasgow, UK

Postgraduate Course Presentation

Power Electronics & HVDC Delivery Systems

+ Latest developments in Multi-terminal HVDC Networks

Time: 08.00 – 17.00 hours: Date: 22-26 February 2016
Venue: Seminar Room 2/Computer Lab
Smart Grid Building, Westville Campus

Dr Grain obtained the BSc (Eng) with first class and MSc (Eng) degrees in Electrical Machines and Power Systems from Sudan University of Science and Technology in 1998 and 2002 respectively. From 2002 to 2004, he was a Lecturer in the Department of Electrical Engineering, Kordofan University. In 2004, he proceeded with post-graduate studies at the University of Strathclyde, Glasgow, UK where he obtained a PhD in Power Electronics in 2007. He was then appointed as an Assistant Professor at Kordofan University. From 2008 to date, he has been a Senior Researcher at the Technology & Innovation Centre, Department of Electronic and Electrical Engineering, University of Strathclyde, Glasgow, UK. Dr Grain is among the world's leading researchers in the area of Power Electronics. His scope of activities includes: modelling & control of HVDC transmission systems and multi-terminal DC grids; advanced DC-DC converters for multi-terminal HVDC grids; multilevel converters for medium and high-voltage applications; grid interfacing of renewable energy; control of grid connected current and voltage source converters; advanced modulation and control techniques for fault tolerant HVDC converters; smart grids and dynamics of hybrid power systems. He has supervised a vast number of MSc and PhD students in these research areas.

Dr. Adam has authored and co-authored over 100 IEEE and IET journal and conference papers, in the area of multilevel converter topologies and control, control of FACTS devices and HVDC transmission systems, and grid integration of renewable power, and is highly sort after as a consultant to industry. He is an IEEE member and IEEE power electronics society member. He is a reviewer of several Transactions and Journals: IEEE Transactions; IET Journals and other European Journal of Power Systems and International Journal of Computation and Mathematics in Electrical and Electronic Engineering (COMPEL). He is also a reviewer of several IEEE international conferences: ISIE; ECCE and EEEIC; IECON.

Eskom Centre of Excellence in HVDC Engineering

The Eskom Centre of Excellence (CoE) at the University of KwaZulu-Natal, which also serves as the Eskom Power Plant Engineering Institute (EPPEI) Specialization Centre in High Voltage Direct Current (HVDC) Engineering is a high-performance multi-disciplinary research center which focusses on research in technology relating to HVDC, power systems (including lines) and power electronics relating to AC systems. The Center engages in applied scientific research and technology development in support of the National Development Plan (NDP) of the South African Government, and to improve the living standards of people in the South African society and to contribute towards nation building.

The purpose of the Center is to contribute to the South African engineering and scientific expertise through its own fundamental and applied research, and through collaborative work with others. The multidisciplinary nature of our research is reflected in the past, current and future activities of the Centre's research with industry and community-based development projects. The Centre engages in inter-disciplinary approaches to the resolution of real-world engineering problems facing the electric power industry. It has four operational research laboratories, namely:

- HVDC Laboratory – which focuses on High Voltage Direct Current (DC) engineering, design, analysis and testing.
- HVAC Laboratory – which focuses on High Voltage Alternating Current (AC) engineering, design, analysis and testing.
- SMART Grid Research Laboratory – A state-of-the-art modern facility for training/research development (modelling, simulation and real-time analysis) of Smart Technologies and the integration of various RE technologies into the Grid.
- Vibration Research and Testing Centre (VRTC) – which focusses on overhead transmission lines, mechanics of conductors, insulators, line supports and vibration analysis.

Research Opportunities:
There are research opportunities available at the Centre for postgraduate students leading to the MSc or PhD in Electrical Engineering, in key areas such as: grid integration of renewable energy, smart grids, voltage source converter HVDC schemes, modular multi-level converters; design, analysis, control and modulation techniques for multi-phase electric machines for motoring and generator applications in electric vehicles/wind power generation; high voltage line design/performance; power network analysis, stability at 600, 800 and 1000kV HVDC; contingency/security analysis, hybrid power transmission systems; the physics of flashover mechanism of line insulation breakdown under negative HVDC polarity; partial and gaseous discharge characteristics on HVDC transmission systems under different environmental conditions; effect of CO_2 Concentration on discharge characteristics; influence of dilute CO_2 concentration on AC/DC spark-over in atmospheric air; characteristics of DC spark-over; gas temperature of steady glow and streamer discharges in atmospheric air gap (at sea level).

A broad spectrum of local and international faculty serve as supervisors/co-supervisors, to provide expert support for each student and their research projects.

Enquiries on research opportunities and competitive funding can be made from the Centre's Administrator:

Ms. Jay Gama
Tel: +27 31 2608022
Email: gamajf@ukzn.ac.za

Course Host

Inno Davidson, PhD, *Fellow*, SAIEE
Director / Research Coordinator
Eskom Centre of Excellence in HVDC Engineering
School of Engineering, University of KwaZulu-Natal
Smart Grid Building, Westville Campus
Durban 4041, REPUBLIC OF SOUTH AFRICA
Phone: +27 (0) 31 260 7511
Email: Davidson@ukzn.ac.za

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