



## High Voltage Direct Current Transmission: Converters, Systems and DC Grids

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### DESCRIPTION

This comprehensive reference guides the reader through all HVDC technologies, including LCC (Line Commutated Converter), 2-level VSC and VSC HVDC based on modular multilevel converters (MMC) for an in-depth understanding of converters, system level design, operating principles and modeling. Written in a tutorial style, the book also describes the key principles of design, control, protection and operation of DC transmission grids, which will be substantially different from the practice with AC transmission grids.

The first dedicated reference to the latest HVDC technologies and DC grid developments; this is an essential resource for graduate students and researchers as well as engineers and professionals working on the design, modeling and operation of DC grids and HVDC.

Key features:

- Provides comprehensive coverage of LCC, VSC and (half and full bridge) MMC-based VSC technologies and DC transmission grids.
- Presents phasor and dynamic analytical models for each HVDC technology and DC grids.
- Includes HVDC protection, studies of DC and AC faults, as well as system-level studies of AC-DC interactions and impact on AC grids for each HVDC technology.
- Companion website hosts SIMULINK SimPowerSystems models with examples for all HVDC topologies.

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## ABOUT THE AUTHOR

### **Professor Dragan Jovcic, University of Aberdeen, Scotland, UK**

Professor Jovcic has been with the University of Aberdeen since 2004. Between 2000 and 2004 he worked as a Lecturer with the University of Ulster. He was a Design Engineer in the New Zealand power industry between 1999 and 2000, and a visiting professor on a 6-months appointment at McGill University, Canada in 2008. His research career has focused on HVDC, FACTS and DC grids. Professor Jovcic has published around 80 articles related to HVDC and power electronics applications, to transmission systems. He has supervised numerous externally funded research projects with the total budget of over £2.5million. He has thirteen years of university teaching experience in the subjects of electrical engineering and control in UK. Professor Jovcic is Senior member of IEEE and a CIGRE member; he is also a member of three CIGRE working groups.

### **Dr Khaled Ahmed, University of Aberdeen, Scotland, UK**

Dr Ahmed has been working in the renewable energy field for more than eight years. He has been a researcher on two main projects sponsored by the EPSRC research council. He is a senior member of the IEEE industrial electronics society and has published over 53 technical papers in refereed journals and conferences related to renewable energy applications, modular multilevel converter based applications, and HVDC systems. Dr Ahmed has eleven years of university teaching experience in the subjects of electrical engineering, power electronics and control in Egypt and the UK. Recently, he was part of a 2-lecturer team who designed and delivered a continuing professional development (CPD) course on HVDC for the SSE HVDC technology engineering team (SSE is a leading electricity and gas company, operating mainly in the UK and Ireland).

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