Control and Protection of Multi-Terminal DC Grids

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Abstract
High Voltage DC (HVDC) transmission is a long-standing technology with many installations around the world. Over the past few years, significant breakthroughs in the voltage-sourced converter technology along with their attractive features have made the HVDC technology even more promising in providing enhanced reliability and functionality and reducing cost and power losses. Concomitantly, significant changes in generation, transmission, and loads such as (i) integration and tapping renewable energy generation in remote areas, (ii) need for relocation or bypassing older conventional and/or nuclear power plants, (iii) increasing transmission capacity, and (iv) urbanization and the need to feed the large cities have emerged. These new trends have called for Multi-Terminal DC (MTDC) systems, which when embedded inside the AC grid, can enhance stability, reliability, and efficiency of the present power grid. The strategic importance of MVDC and HVDC grids is evidenced by the number of worldwide projects currently in their advanced planning stage, e.g., European "Supergrids" and the Baltic Sea project along with several projects in the US and China. This presentation is focused on opportunities brought by the MTDC grids and addressing the technical challenges associated with their operation, control and protection in future power systems.

Bio
Maryam Saeedifard received the Ph.D. degree in electrical engineering from the University of Toronto, in 2008. Since January 2014, she has been with the School of Electrical and Computer Engineering at Georgia Institute of Technology, where she is currently a professor and holds a Dean's professorship. Prior to joing Georgia Tech, she was an assistant professor at Purdue University. She is the recipient of Roger Webb's Excellence in Mentorship Award from the School of Electrical and Computer Engineering at Georgia Tech in 2023, the 8th Nagamori Awards from Nagamori Foundation in 2022, Roger Webb's Outstanding Mid-Career Faculty Award from the School of Electrical and Computer Engineering at Georgia Tech in 2021, U.S. Clean Energy Education and Empowerment (C3E) Technology Research & Innovation Award from the Department of Energy in 2021, First Place Prize Paper Award from the IEEE Transactions on Power Electronics in 2023, 2022 and 2021, Best Transactions Paper Award of the IEEE Transactions on Industrial Electronics in 2018 and 2016, IEEE J. David Irwin Early Career Award in 2018, U.S. National Academy of Engineering, Frontiers in Engineering in Education in 2012, U.S. National Academy of Engineering, Frontiers in Engineering in 2011, and IEEE Richard M. Bass Outstanding Young Power Electronic Engineer Award in 2010. She is an IEEE Fellow and is currently serving as a Co-Editor-in-Chief of IEEE Trans. on Power Electronics. Her research interests include power electronics and its applications in terrestrial and mobile power systems.

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