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**TRENDS IN REAL-TIME DIGITAL SIMULATION OF
ELECTROMAGNETIC TRANSIENTS OF INTERCONNECTED
POWER SYSTEMS**

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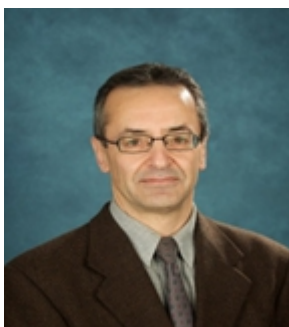
Traditionally, applications of digital real-time (RT) simulator in power system studies were limited to performance evaluation of relay/protection systems. In such applications, a small part of an interconnected system is simulated in a RT time simulation environment and the simulated signals are communicated to a physical relay/protection platform in an "open-loop" fashion.

Recent proliferation of electronically-coupled apparatus in power systems has introduced unconventional and more sophisticated controls that often include custom-tailored and proprietary hardware/software modules which do not lend themselves to the conventional digital time-domain simulation methods and in particular to RT methods. Consequently, the concept of control hardware-in-the-loop (HIL), based on RT simulation of the system, has emerged as the approach for design, development and testing of the control platforms. In spite of the recent developments in microelectronics and the availability of powerful processors, the cost associated with a RT-HIL platform for representing a realistic-size system is still excessive and the main impediment for widespread use of simulators.

This talk:

- presents a general overview of the subject;
- highlights barriers of real-time hardware-in-the-loop simulation of the power system;
- discusses recent developments and research trends in hardware and software developments to enable real-time simulation of a realistic-size power system at reasonable infrastructure cost;
- presents off-line, real-time and faster-than-real-time simulation case studies.

Biography



Reza Iravani received his B.Sc. degree in 1976 (Tehran, Iran) and until 1979 worked as a consultant for the electric utility industry. He received his M.Sc. (1981) and Ph.D. (1985) degrees in electrical engineering from the University of Manitoba, Canada.

Presently, he is a professor in the Department of Electrical and Computer Engineering at the University of Toronto, Canada. His research interests include modeling, control, and dynamics of interconnected HVDC-AC power grids. Dr. Iravani is an IEEE Fellow, a Collective Member of CIGRE, a Professional Engineer in Ontario, Canada, and former Editor-in-Chief of the IEEE Transactions on Power Delivery.