



Power Systems Engineering Research Center

Decision Tree Based Online Voltage Security Assessment Using PMU Measurements

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**Project Tele-Seminar for PSERC Industry and University Members Only.
Register to participate, even by webcast!**

January 27, 2009
2:00-3:00 p.m. Eastern Time (11:00-12:00 p.m. Pacific)

This tele-seminar is based on PSERC Project S-27G.
([Executive Summary](#) | [Report for Member Viewing](#))

Description: With increasing difficulty in approving and installing new transmission lines, modern power systems are operated closer to their limits due to the continuous increase in load demand and generation capacity for the past few decades. Thus, severe contingencies may affect system stability leading to a large-scale blackout such as the one that occurred on August 14th, 2003 in North America. Among the different stability problems, voltage instability is one of the most critical system conditions that threatens system secure operations. This research project presents and examines an online voltage security assessment scheme to evaluate post-contingency voltage security in real time by using synchronized phasor measurement units and periodically updated decision trees. The main objective was to develop a fast and accurate tool to predict whether certain severe contingencies will initiate voltage collapse at the current operating condition for the purpose of preventing voltage collapse in a modern power system. The online assessment results can be used to guide system operators in real-time decision making. This project involved the participation of a PSERC member company – American Electric Power Corporation – that provided supplemental funding for the project and the associated data, and participated as an industry advisor to the project.

Biography: **Vijay Vittal** is the Ira A. Fulton Chair Professor in the Electrical Engineering department at Arizona State University. From 1982 – 2004 he served as a faculty member at Iowa State University. His research interests are in the area of power system dynamics, dynamic security assessment of power systems, power system operation and control, and application of robust control techniques to power systems. He is the author and co-author of several papers in his field. In 1992 he co-authored the textbook entitled *Power System Transient Stability Assessment Using the Transient Energy Function Method* with A. A. Fouad, and in 1999 he co-authored the textbook entitled *Power System Analysis* with A. R. Bergen. He currently is the director of PSERC. He is a recipient of the 1985 Presidential Young Investigator Award. In 1997, he was elected as a Fellow of IEEE. He was also the recipient of the 2000 IEEE Power Engineering Society Outstanding Power Engineering Educator Award. From 1998-2000 he was the Chairman of the IEEE Power Engineering Society System Dynamic Performance

Committee. He was elected to the U.S. National Academy of Engineering in 2004. He is the Editor in Chief of the IEEE Transactions on Power Systems.

Speaker Contact Information

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Participation by Webcast (Media-site login is required to view this project tele-seminar via a webcast): You can participate in this PSERC project tele-seminar via webcast, but you must register (see below) to get the login information. The webcast will include the audio and the slides so you will not have to download the slides in advance. If you want to ask questions, you should register for phone participation instead.

Participation by Phone: Live audio will be provided via a teleconference phone bridge. After registering, you will be sent connection information for the conference phone bridge. You will need to follow along with the presentation slides. The presentation slides will be emailed to you on Jan. 27; the slides will not be available on the website.

Registration for Phone and Webcast Participation: To indicate that your organization would like to participate, send an email to Theresa.Herr@asu.edu with the subject "Vittal Seminar". Connection information will be sent before the seminar. There is no charge for participating!

Professional Development Hour Certification: PDH certification is available for PSERC members (only). Send an email requesting PDH certification to Theresa.Herr@asu.edu with the subject "PDH" after the seminar. *Include the name and title of each participant.*

Seminar Logistics and Assistance

Connection information will be emailed to you after you submit your request. If you have any questions, please contact Theresa Herr, PSERC's administrative assistant, at 480-965-1643 or Theresa.Herr@asu.edu. You can also contact Dennis Ray, PSERC Executive Director, at 608-265-3808 or djray@engr.wisc.edu.