



PSERC WEBINAR

Analysis and mitigation of resonant forced oscillations

Mani Venkatasubramanian

Washington State University

There have been several recent widespread oscillation events in the eastern and western interconnections, and in Europe, which were caused by forced oscillations resonating with system modes. For instance, large MW oscillations were seen throughout the eastern interconnection on January 11, 2019, from a 0.25 Hz forced oscillation at a power plant in Florida. These events are related to the phenomenon of interarea resonance when a forced oscillation interacts with system interarea modes with close-by frequencies. This talk will summarize the mathematical theory of interarea resonance based on linear system analysis and present a novel open-loop control for temporarily mitigating resonant wide-area oscillations. In the proposed methodology, PMU measurements are used to design a strategic sinusoidal oscillation injected at a different control location to counter the resonant oscillation from an unknown location. The control design is model-free and uses locally available measurements. This is meant to reduce the severity of the resonant wide-area oscillations in the interim to buy operators some time for locating and correcting the forced oscillation problem.

OCTOBER 12, 2021

[LINK TO WEBINAR](#)

2:00-3:00 P.M. EDT

(11:00-12:00 P.M. PDT)

Mani V. Venkatasubramanian is a Boeing Distinguished Professor in Electrical Engineering at Washington State University (WSU), Pullman, WA. He also serves as the Director of Energy Systems Innovation Center (ESIC) at WSU. He received his M.S. and D.Sc. in Systems Science and Mathematics from Washington University, St. Louis, MO, and B.E. (Hons). In Electrical and Electronics Engineering from Birla Institute of Technology and Science, Pilani, India. He was invited member of the working groups that studied the 1996 Western interconnection blackouts and the 2003 Northeastern blackout. He serves as the Chair of the IEEE PES Working Group on Power System Dynamic Measurements. He is a Fellow of IEEE.

