PSERC Power Systems Engineering Research Center

PSERC WEBINAR

Coordinated Wide-Area Polytopic Control Design using Linear Matrix Inequality

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This presentation focuses on the development of a polytopic control design that uses phasor measurement unit (PMU) data for damping low frequency oscillations (LFOs) over a wide range of operating conditions. The control is formulated using a combination of linear matrix inequality (LMI) and *enhanced* selective modal analysis (SMA) and coordinates the operations of existing power system controllers, such as power system stabilizers (PSSs), high voltage DC (HVDC) lines, and static VAR compensators (SVCs). The following objectives are attained by the design: (1) avoids modification of existing controller configurations, (2) prevents negative interactions between different controllers, and (3) provides flexibility in signal selection. Practical constraints such as loss of signals from one or more PMUs as well as delays in the wide-area signal communication are also considered.

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Anamitra Pal is an Assistant Professor in the School of Electrical Computer and Energy Engineering at Arizona State University. He received his Bachelor of Engineering (B.E.) degree (summa cum laude) in electrical and electronics engineering from Birla Institute of Technology, Mesra, Ranchi (India) in 2008 and his M.S. and Ph.D. degrees in electrical engineering from Virginia Tech, Blacksburg, in 2012 and 2014, respectively. From 2014-2016, he was an Applied Electrical and Computer Scientist in the Network Dynamics and Simulation Science Laboratory at the Biocomplexity Institute of Virginia Tech. His current research interests include power system modeling, transient and dynamic stability analysis, critical infrastructure resiliency assessment, and wide area measurements-based protection, monitoring, and control. He received the 2018 Young CRITIS Award for his contributions to critical infrastructure resiliency.