PSERC Power Systems Engineering Research Center

PSERC WEBINAR

Towards grid-forming control for fault and overload ride through

Dominic Gross
University of Wisconsin - Madison

Grid-forming converters are commonly envisioned to replace conventional synchronous generators as the cornerstone of future power systems. However, compared to synchronous generators, converter-interfaced generation is subject to significant limits (e.g., current limits, modulation limits, internal energy storage) that are not fully accounted for in the design of grid-forming controls. Moreover, most grid-forming controls is designed with three-phase balanced grids in mind. In this talk, we first review common architectures for GFM control with current limiting features and discuss their properties. Then, we present a generalized three-phase droop control and discuss its applications to unbalanced three-phase systems and unbalanced fault ride-through. Finally, we present preliminary results on a systematic approach to constrained grid-forming control that formalizes the high-level objective of retaining as many grid-forming features as possible under general converter constraints.

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LINK TO WEBINAR

(10:00-11:00 A.M. PT)

Dominic Gross is an Assistant Professor with the Department of Electrical and Computer Engineering at the University of Wisconsin-Madison, Madison, WI, USA. He received his Ph.D. in Electrical Engineering from the University of Kassel, Germany, in 2014. Prior to joining UW-Madison, he was a postdoctoral researcher at the Automatic Control Laboratory of ETH Zürich. He received an NSF CAREER award in 2022 and is the lead for control research in the DOE-sponsored UNIFI consortium. His research focuses on grid-forming control of power electronics-interfaced renewable generation such as wind and solar power that is envisioned to be the cornerstone of tomorrow's resilient zero-carbon power system. Starting from a rigorous foundation in distributed control and optimization, his work aims to bridge the gap between power system stability analysis and advanced control of converter-interfaced generation, storage, and transmission.