Applications of Advanced Non-linear Control to Inverters for Microgrids

>Providing expertise in broad areas of non-linear control engineering, including the application of control design and algorithm analysis for microgrids.

Competitive advantage

- Advanced analytical techniques to assess the dynamics of non-linear systems and from there design non-linear control systems
- An experienced interdisciplinary research team with a significant collaborative track record in the fusion of electrical power engineering and advanced control techniques
- Methods for controlling renewables and electrical machines that have broad applicability

Impact

- New, robust inverter control systems that can eliminate high-bandwidth communications
- Advanced inverter control techniques suited to autonomous power systems
- Enhanced understanding of the dynamics of the interaction between inverter-derived generation and converter-supplied load

Successful applications

- Application of advanced methods of nonlinear control theory to rigorously establish the stability of single-phase microgrids using proportional and resonant controllers and phase-locked loop feedback, which confirms the simulated and experimental results

More Information

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Capabilities and facilities

- Analysis of non-linear systems
- Non-linear control theory for inverter-interfaced microgrids based on virtual oscillator control and proportional and resonant controllers
- A state-of-the-art laboratory microgrid facility (Tyree Energy Technology Building)
- State-of-the-art real-time digital simulation facilities for hardware-in-the-loop testing

Our partners

- A.W. Tyree Foundation
- AEMO
- Sungrow