

Can data-driven control be used in modern power grids?

This paper provides a comprehensive review on emerging data-driven control for the applications in modern power grids. The data-driven control mainly consists of two ingredients -- identification and control, which should be conducted jointly in a either sequential or simultaneous manner.

What is a microgrid & how does it work?

Microgrid (MG) is a scaled-down version of the conventional grid. It is self-sufficient and can supply the local demands of a particular geographic area. The active components of the MG are renewable energy sources like wind turbines (WT), photovoltaic (PV), micro-hydro generators, biomasses, fuel cells, etc.

What makes a microgrid different from a traditional power grid?

Different from traditional power grids, microgrids are characterized by low inertia, coupled states, and wide-frequency dynamics response and are susceptible to high uncertainty and nonlinearity when confronting large disturbances.

Are linear data-driven identification and control still trending in power grid applications?

Linear data-driven identification and control are still trending in certain power grid applications when the introduced model uncertainty is reasonably bounded (i.e., the small signal assumption roughly holds). A typical example is oscillation damping control as discussed in Section 5.1.

What are the future trends of data-driven methods in power grids?

Historical path and future trends of data-driven methods in power grids are provided. Modern power grids are fast evolving with the increasing volatile renewable generation, distributed energy resources (DERs) and time-varying operating conditions.

Can a microgrid buy power?

Data sets of PV, wind, and load are obtained with their associated probabilities for each of the ten scenarios. The grid can be considered the virtual generator. A microgrid can buy power when there is a deficit and supply power when it has excess renewable generation.

Based on the power flow model, the mapping relationship between nodal injected power and voltage magnitude is established to realize the data-driven voltage estimation. Instead of load flow calculation, voltage ...

Hierarchical Data-Driven Protection for Microgrids with 100% Renewables Abstract: The accurate detection and isolation of faults is critical for the reliable operation of microgrids (MGs). ...

In this context, a novel data-driven approach for fault detection and location in microgrids is proposed, by

using graph theory representation and micro-synchrophasors also ...

This paper proposes a decentralised data-driven distributionally robust economic dispatch (DRED) model for the coordinated operation of DN with multiple MGs. The major contributions of this paper can ...

In this project a comprehensive data-driven distributed combined primary/secondary controller design method is proposed for microgrids. This method provides transient and steady-state performances, including power ...

Data-driven Design & Control of Low-Carbon Microgrids for Developing Communities o Pallavi Bharadwaj oSame analysis is applied for wind power based microgrid design for low cost and ...

This article answers two important research questions: 1) Which data-driven detection scheme offers the best detection performance against stealth cyber-attacks in dc microgrids? 2) What ...

A microgrid is a low-voltage distribution network that comprises multiple DERs and localized loads. It can operate in parallel with the main grid or in islanding mode, where it ...

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