EIEI POWER

Solar inverter field space

Overview

How to model grid-connected inverters for PV systems?

When modeling grid-connected inverters for PV systems, the dynamic behavior of the systems is considered. To best understand the interaction of power in the system, the space state model (SSM) is used to represent these states. This model is mathematically represented in an expression that states the first order of the differential equation.

How to control a space-state inverter?

Apart from implementing the space-state model, there is a need to implement a control strategy to ensure the inverter’s operation is optimal and efficient. These control techniques include proportional-integrated derivative (PID) control, model predictive control (MPC), and sliding model control.

How are inverters modeled?

Similar to synchronous machines, inverters can be modeled via ordinary differential equations (ODEs). The majority of the controllers can be modeled with ODEs if time-dependent delays are approximated with lags or simply disregarded . Power system dynamics are generally driven by two types of state variables: slow and fast.

How does a PV inverter's duty cycle work?

The inverter’s duty cycle is adjusted using the P&O algorithm implemented in a repeating regular interval to maximize power to the grid. This is essential in understanding the power changes in the PV system where the power difference before perturbation is subtracted from the new power after perturbation.

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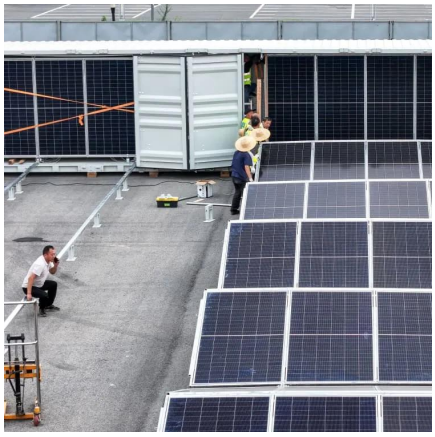

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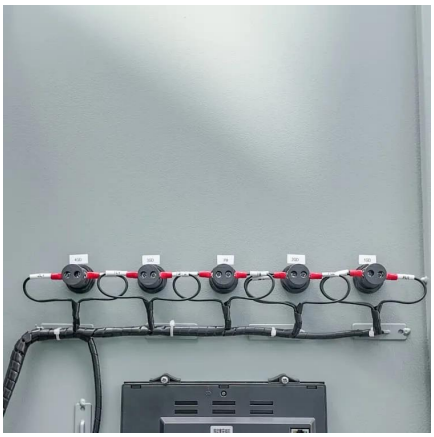

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