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Model Predictive Control Based Energy Management System Literature Assessment for RES Integration
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Abstract

Over the past few decades, the electric power industry evolved in response to growing concerns about climate change and the rising price of fossil fuels. The usage of renewable energy sources (RES) rose as a remedy for these problems. The increased penetration of RES in the existing generation system increased the need for an intelligent energy management system (EMS) so that the system can operate in any possible circumstances. Many sectors of society, including the education sector, are working to realize the importance of this sustainable energy system. This paper reviews the process of selecting an efficient control technique for continuous power flow from different RES to meet the load demand requirement using an enhanced model predictive control (MPC)-based EMS framework. This EMS is a software platform to provide fundamental support services and applications to deliver the functionality needed for the effective operation of electrical generation and transmission facilities to ensure adequate security of energy supply at minimum cost. The centralized EMS with technical objectives focusing on power quality and seamless power flow can be achieved through dynamically enhanced MPC. © 2023 by the authors.

Author Keywords

distributed energy resources (DERs); energy management system (EMS); energy storage system (ESS); microgrid (MG); model predictive control (MPC); renewable energy (RE); renewable energy sources (RES); solar photovoltaic (PV)

Index Keywords

Application programs, Climate change, Electric industry, Electric load flow, Electric power transmission, Energy efficiency, Energy management, Energy management systems, Energy security, Fossil fuels, Natural resources, Power quality, Renewable energy resources, Solar power generation; Distributed energy resource, Distributed Energy Resources, Energy management system, Energy storage system, Microgrid, Model predictive control, Model-predictive control, Renewable energies, Renewable energy, Renewable energy source, Solar photovoltaic, Solar photovoltaics, Storage systems; Model predictive control

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