

# Research on Intelligent Control Methods of Microgrid

What are the six control techniques for Microgrid Applications?

This research identifies and classifies six control techniques as the principal conceptual development framework of control modelling for innovative microgrid applications. These are linear, non-linear, robust, predictive, intelligent and adaptive control techniques.

What are the advanced control techniques for frequency regulation in micro-grids?

This review comprehensively discusses the advanced control techniques for frequency regulation in micro-grids namely model predictive control, adaptive control, sliding mode control, h-infinity control, back-stepping control, (Disturbance estimation technique) kalman state estimator-based strategies, and intelligent control methods.

Can artificial intelligence improve microgrid control?

Classical control techniques are not enough to support dynamic microgrid environments. Implementation of Artificial Intelligence (AI) techniques seems to be a promising solution to enhance the control and operation of microgrids in future smart grid networks.

Can predictive control techniques be used for intelligent Microgrid controller levels?

Thus, the predictive control techniques based on the MPC and ANN, depending on the system achievement, can be effectively modelled for all three aspects of intelligent microgrid controller levels, from primary to tertiary, in DC and AC power systems.

Do microgrids support control and estimation techniques?

Thus, an assessment of essential estimation techniques is conducted in an intelligent microgrid that supports the control techniques. This work also provides a perspective vision for hierarchical and architectural control and estimation techniques for effectively operating microgrids.

What is a microgrid estimation technique?

The estimation techniques of the microgrid variables and parameters deal with the measurement and monitoring system to accurately reinforce the dynamic performance of control techniques. The design and modelling of estimation techniques in the microgrids improve the dynamic behaviour of the system operation.

So far, several control methods for secondary LFC in islanded MGs, such as  $H$  resistant control [5], linear matrix inequality control (LMI) [6], model-based prediction (MPC) ...

Section 2 introduces the multi-energy microgrid architecture and multi-agent partitioning method; Section 3 introduces the functional architecture of the hierarchical control of multi-energy microgrid; Section 4 proposes the ...

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The control strategies were modeled for microgrids using six design layers: adaptive, intelligent, robust, predictive, linear, and non-linear. The estimation schemes were ...

This book, discusses the latest research on the intelligent control of two important components in smart grids, namely microgrids (MGs) and electric vehicles (EVs). It focuses on developing theoretical frameworks and proposing corresponding ...

Previous studies indicate that several research works have been done concerning the intelligent control of the microgrids system. Adaptive neuro-fuzzy inference system (ANFIS) and fuzzy ...

In recent years, renewable energy has seen widespread application. However, due to its intermittent nature, there is a need to develop energy management systems for its scheduling and control. This paper ...

This paper introduces an advanced control strategy that employs artificial intelligence, specifically deep neural network (DNN) predictions, to enhance microgrid performance, particularly in an islanding mode where ...

The existing techniques using conventional controllers in microgrid control are well suited for voltage regulation, but the frequency cannot be adequately controlled using conventional and linear ...

The IoT is used in various applications, including smart grid, microgrids, intelligent buildings, and intelligent control devices, to monitor and track essential information about the target environment. Numerous studies ...

Abstract. Due to the reduction in fossil fuel abundance and the harmful environmental effects of burning them, the renewable resource potentials of microgrid (MG) structures have become highly highly. However, the ...

This paper provides a novel method called hybrid intelligent control for adaptive MG that integrates basic rule-based control and deep learning techniques, including gated recurrent units (GRUs), basic recurrent neural ...

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Smart Microgrid Research Center, Najafabad Branch, Islamic Azad University, Najafabad, Iran ... Microgrid control method Control type Short characteristic Related Reference; ... An intelligent ...

Therefore, this paper briefly reviews the control architectures, existing conventional controlling techniques, their drawbacks, the need for intelligent controllers and then extensively reviews ...

