Abstract

The technology of Smart Grid is believed to be the future of power system networks. Smart Grid (SG) gains its importance due to its proven ability to improve stability, efficiency and robustness of electrical power grids. SG system consists mainly of two components which are electrical distribution system and communication layer. In the electrical distribution system, the generated energy comes from a network of distributed energy resources "DERs", which is called micro-grid. In most cases, these DERs are recommended to be renewable energy sources "RESs" to reduce emissions and harmful environmental effects. One of the main drawbacks of renewable energy sources is that their availability varies with time and so that the micro-grid technology faces various technical challenges which motivate many researchers to adopt techniques to overcome these challenges. In this regard and due to its capability of studying complex interactions between independent rational players, game theory is expected to have a great contribution in the phase of design and analysis of micro-grids. In this paper, the fundamental concepts of game theory are streamlined, an overview on the applications of game theoretical concepts in various micro-grid optimization problems are presented, a novel
A Survey of Game Theory Applications in Electrical Power Micro-Grid Systems

classification of research points covered by researchers are provided. Finally, some future opportunities that are expected to solve some of the technical challenges facing micro-grid technology are introduced.

References

A Survey of Game Theory Applications in Electrical Power Micro-Grid Systems


Index Terms

Computer Science

Circuits and Systems

Keywords
Game Theory, Cooperative Game Theory, Non-Cooperative Game Theory, Smart Grid, Micro Grid, Distributed Generators.