Utilization planning of distributed generation sources in the micro grid using the Ant colony algorithm

Ahmad Mahmoudi ,Mostafa esmaeil beag

Graduate Student / Electrical Power Trend / Islamic Azad University Bushehr Branch

Ph.D. / Electrical Power Trend / Islamic Azad University Bushehr Branch

Ahmadnic2020@gmail.com

Abstract

The use of distributed generation resources is increasing to improve reliability in power systems. Benefits such as reducing network losses and pollution have increased the focus on these resources. The presence of distributed generation sources has led to the discussion of grid grids. A micro grid is a set of distributed generation units and storage devices, along with a set of loads, which, because of intelligent control, behave like a load or generator from the viewpoint of the main grid. In this paper, the design of distributed generation sources for a micro grid that is comprised of the IEEE 33-bus network is studied. For the planning of utilization of distributed generation sources, the consumption of loads is considered as a variable over a period of 24 hours and a 24-hour program for the amount of production of various sources and storage devices with the goal of minimizing network losses is provided. In this paper, an ant colony algorithm is used to solve the optimization problem. Finally, the results indicate the improvement of the voltage profile and network losses, and also the cost effective of the micro grid connection to the main network.

Keywords: Distributed generation resource, Utilization planning, Ant colony

1. Introduction

In conventional electricity interconnection systems, electric power generation is concentrated and powered by large power plants. Across the world, conventional power systems face problems such as the gradual reduction of fossil fuel resources, low energy efficiency, increased transmission and distribution costs of electrical energy, environmental pollution and regulatory constraints. Therefore, the concentrated generation of electric power by large power plants faces challenges [1]. In recent decades, the restructuring of the electricity industry as well as the privatization of this industry has been raised and applied in some countries. During this time, in order to increase the efficiency of exploitation and encourage investors, the power industry has undergone fundamental changes in terms of management and ownership, so in order to create a competitive environment; its various sectors including