A Continuous Ant Colony (C-ANT) algorithm solving the Economic Load Dispatch (ELD) Problem

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Abstract

Classic algorithms that are based on the ant system theory have been designed to face problems with discrete solutions. When dealing with non discrete problems, in order to apply Ant Colony Optimization (AGO) algorithms they should be transformed to discrete problems. The arbitrary limitation of the number of possible solutions for each space is the result of the transformation of the solutions of the problems from the continuous to the discrete workspace. Hence, the choice of the width of the solutions spaces essentially defines the possible best solutions of the problem. In order to deal with this disadvantage, we present a new algorithm: the Continuous Ant Colony (C-ANT). This algorithm encourages local searching around the best solution found in each iteration. The proposed (C-ANT) is applied to a simple ELD problem composed of 4 generators. Comparison to conventional Particle Swarm Optimization (PSO) algorithms is presented.

Keywords and phrases : Economic Load Dispatch (ELD), Ant Colony Optimization (AGO), ant system algorithm, combinatorial optimization, oower system.

1. Introduction

The economic load dispatching (ELD) problem is one of the key problems in power operation and planning. The ELD problem may be expressed by minimizing the total generation cost while satisfying an equality constraint and several inequality constraints.

The economic load dispatching (ELD) problems have complex and non linear characteristics. To solve these problems, various salient mathematical approaches have been suggested for the past decades. Recently,

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Journal of Information & Optimization Sciences Vol. 32 (2011), No. 1, pp. 1–13 © Taru Publications