

Ant colony system solving capacitated location-allocation problems on a line

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Abstract

Ant Colony System (ACS) Algorithm is biologically inspired from the behaviour of colonies of real ants. In this project we apply a modification of ACS, especially on update of pheromone, for the solution of the problem: capacitated location – allocation problem on a line (CLAAL). Computational results demonstrate that ACS is a more effective meta-heuristic for the CLAAL.

Keywords : Location-allocation, ant colony system, meta-heuristic.

1. Introduction

Location-allocation problems along a line are important to be studied because of the following two reasons: On one hand for economic and technological reasons distribution networks are constructed in hierarchies (high-level distribution channels from which low-level channels branch). On the other hand branching facilities too, may cause high costs and so their number locations along the lines and allocation of destinations to them are important components in the design of a system. For these reasons it is important to solve location-allocation problems on a line.

Distribution networks often have a hierarchical structure, similar to the nerve system. Large distribution channels branch into smaller

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