

## Abstract

For some problems a minimum spanning tree has constraints. The constraints are based on the problem. In the network design for telecommunication for example, there is degree-constrained for the nodes. We call the problem degree-constrained minimum spanning tree (DCMST) problem. There are some heuristics to solve the DCMST problem. In this paper the author uses a combinatorial lagrangian function and particle swarm optimization (COLAPSO).

**Keywords:** *particle swarm optimization, lagrangian, minimum spanning tree, degree-constrained*