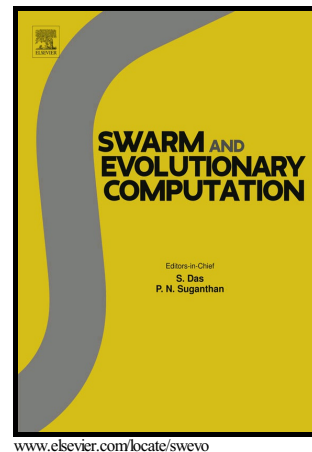


Author's Accepted Manuscript

A Multi-objective Evolutionary Artificial Bee Colony Algorithm for Optimizing Network Topology Design

Amani Saad, Salman A. Khan, Amjad Mahmood



PII: S2210-6502(16)30472-2
DOI: <http://dx.doi.org/10.1016/j.swevo.2017.07.010>
Reference: SWEVO296

To appear in: *Swarm and Evolutionary Computation*

Received date: 25 November 2016
Revised date: 13 July 2017
Accepted date: 17 July 2017

Cite this article as: Amani Saad, Salman A. Khan and Amjad Mahmood, A Multi-objective Evolutionary Artificial Bee Colony Algorithm for Optimizing Network Topology Design, *Swarm and Evolutionary Computation*, <http://dx.doi.org/10.1016/j.swevo.2017.07.010>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

A Multi-objective Evolutionary Artificial Bee Colony Algorithm for Optimizing Network Topology Design

Amani Saad, Salman A. Khan^{*}, Amjad Mahmood

College of Information Technology, University of Bahrain, Sakhir, Bahrain

Abstract

The topological design of a computer communication network is a well-known NP-hard problem. The problem complexity is further magnified by the presence of multiple design objectives and numerous design constraints. This paper presents a goal programming-based multi-objective artificial bee colony optimization (MOABC) algorithm to solve the problem of topological design of distributed local area networks (DLANs). Five design objectives are considered herein, namely, network reliability, network availability, average link utilization, monetary cost, and network delay. Goal programming (GP) is incorporated to aggregate the multiple design objectives into a single objective function. A modified version of MOABC, named as evolutionary multi-objective ABC (EMOABC) is also proposed which incorporates the characteristics of simulated evolution (SE) algorithm for improved local search. The effect of control parameters of MOABC is investigated. Comparison of EMOABC with MOABC and the standard ABC (SABC) shows better performance of EMOABC. Furthermore, a comparative analysis is also done with non-dominated sorting genetic algorithm II (NSGA-II), Pareto-dominance particle swarm optimization (PDPSO) algorithm and two recent variants of decomposition based multi-objective evolutionary algorithms, namely, MOEA/D-1 and MOEA/D-2. Results indicate that EMOABC demonstrated superior performance than all the other algorithms.

Key words:

Artificial Bee Colony algorithm, Goal programming, Network topology design, Multi-objective optimization, Simulated Evolution

^{*} Corresponding author. Salman A. Khan is also an Extraordinary Senior Researcher with Computational Intelligence Research Group, Computer Science Department, University of Pretoria, South Africa.

Email addresses: adomad1983@gmail.com (Amani Saad), sakhan@uob.edu.bh (Salman A. Khan), amahmood@uob.edu.bh (Amjad Mahmood).

Download English Version:

<https://daneshyari.com/en/article/6903188>

Download Persian Version:

<https://daneshyari.com/article/6903188>

[Daneshyari.com](https://daneshyari.com)