ABSTRACT

Setting up lightpaths for a set of requested connection of wavelength division multiplexing (WDM) network, is by routing and assigning wavelengths to each connection. So as to minimize the use of network resources or maximize the traffic served, is called the routing and wavelength assignment (RWA) problem. A new idea based on Artificial Bee Colony (ABC) algorithm is introduced for solving RWA problem which is known to be an NP-hard problem. In the proposed ABC-RWA approach every food source represents a possible and feasible candidate lightpath between each original and destination node span in demand matrix. The situation of the food source is modified by some artificial bee in the population where the aim is to discover the places of food sources. The food source with the highest nectar value seems to be a solution which is evaluated by the fitness function.

This thesis proposes solutions to solve the RWA problem using artificial bee-colony algorithm in order to achieve better performance of the network connection to serve a given demand matrix of an optical network to reach RWA global solution. The work will evaluate the path length (propagation delay) for solving RWA problem with ABC algorithm in a real-world optical networks test bench to find optimal routes for connection request in demand matrix according to objective function and some physical and operational constraints in Dense Wavelength Division Multiplexing (DWDM) optical networks.

Based on simulation with several generated traffic distribution, ABC algorithm can be used to solve routing and wavelength problem at DWDM transport network as shown that in line with iteration process the path length observed toward minimum value. The number of iteration needed to reach the fitness value depends on several parameter such as number of connection request, number of wavelength and alternative path, the distribution of generated traffic and also population size.