

Nasrudin, 2015, *Hybrid Artificial Bee Colony Algorithm dan Firefly Algorithm untuk Menyelesaikan Vehicle Routing Problem (VRP)*, Skripsi ini dibawah bimbingan Dr. Miswanto, M.Si dan Dr. Herry Suprajitno, M.Si. Departemen Matematika, Fakultas Sains dan Teknologi, Universitas Airlangga.

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## ABSTRAK

*Vehicle Routing Problem (VRP)* adalah suatu permasalahan untuk menentukan rute optimal dalam pengiriman barang dari satu depot ke sejumlah pelanggan yang memenuhi beberapa kendala. Tujuan dari penulisan skripsi ini adalah menyelesaikan *Vehicle Routing Problem* dengan *Hybrid Artificial Bee Colony Algorithm* dan *Firefly Algorithm*. *Artificial Bee Colony Algorithm* merupakan salah satu metode diinspirasi dari kehidupan koloni lebah pada saat mencari sumber makanan. *Firefly Algorithm* merupakan algoritma yang diinspirasi pada berkedipnya kunang-kunang. *Hybrid Artificial Bee Colony Algorithm* dan *Firefly Algorithm* merupakan gabungan dari kedua algoritma tersebut, dengan dilakukan *Artificial Bee Colony Algorithm* sebagai proses pertama kemudian dilanjutkan proses *Firefly Algorithm*. Proses algoritma ini dimulai dengan inialisasi parameter, pembangkitan *foodsources* awal, menentukan rute, menghitung nilai fungsi tujuan, pencarian *neighbourhood* dari *foodsources* awal, menentukan rute kemudian menghitung nilai fungsi tujuan, seleksi, pencarian solusi baru dengan *neighbourhood* dari solusinya untuk onlooker bee, menentukan rute, menghitung nilai fungsi tujuan, pemilihan populasi untuk *Firefly Algorithm*, menghitung intensitas tiap *firefly*, menghitung *distance* antar *firefly*, menghitung *attractiveness*, proses *movement*, *update* solusi dan proses berlanjut sampai maksimal iterasi. Data yang digunakan adalah data 10 pelanggan, dan 100 pelanggan serta diselesaikan dengan bahasa pemrograman Java Netbeans IDE 7.3.1. Nilai fungsi tujuan terbaik dari hasil proses *Hybrid Artificial Bee Colony Algorithm* dan *Firefly Algorithm* untuk data 10 pelanggan diperoleh jarak minimum sebesar 316.97745 dan untuk data 100 pelanggan diperoleh jarak minimum sebesar 2058.7695.

**Kata Kunci:** *Artificial Bee Colony Algorithm, Firefly Algorithm, Hybrid, Vehicle Routing Problem.*

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## ABSTRACT

Vehicle Routing Problem is defined as a problem of determining the optimal route in goods despatch from a depot to customers which is meet a constrain. The purpose of writing this undergraduate thesis is to solve the Vehicle Routing Problem with a Hybrid Artificial Bee Colony Algorithm and Firefly Algorithm. Artificial Bee Colony is one of method inspired by behaviour a colony of bees when they find the food source. Firefly Algorithm is algorithm an algorithm which inspired by flashing fireflies at night. Hybrid Artificial Bee Colony Algorithm and Firefly Algorithm are the combination of these two algorithm mentioned. With Artificial Bee Colony as first process and then continued by Firefly Algorithm as second process. The process of algorithm was started by initialization parameters, generate food sources, determine route, calculate objective function, find neighbourhood from the solution early, determined route and then calculate objective function, selection, find neighbourhood form the solution for onlooker bee, determined route and calculate objective function value, select generate population of firefly algorithm, compare the intensity of light between the fireflies, calculate the distance, calculate attractiveness, movement process, update solution and the process running until maximum iteration. The data used is the data 10 customer and data 100 customer, and the Java programming language solved with Net Beans IDE 7.3.1. The objective function based on hybrid artificial bee colony algorithm and firefly algorithm for data 10 costumers is 31697745, and for data 100 costumers obtained a minimum distance is 2058.7695.

**Keywords:** Artificial Bee Colony Algorithm, Hybrid, Firefly Algorithm, Vehicle Routing Problem.