

**metaheuristicOpt: R PACKAGE UNTUK OPTIMASI DENGAN
MENGUNAKAN ALGORITMA POPULATION BASED
METAHEURISTIC**

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ABSTRAK

Optimasi, adalah sebuah metode untuk mendapatkan nilai optimal atau nilai yang mendekati optimal dari sebuah fungsi objektif, telah banyak digunakan pada berbagai bidang seperti bidang *engineering*, kimia, bisnis dan lain-lain. Penelitian ini bertujuan untuk membangun sebuah R Package yang mengimplementasikan sebelas algoritma dengan prinsip *population based metaheuristic* yang terinspirasi dari fenomena alam dan kebiasaan binatang. Bahasa Pemrograman R dipilih karena berdasarkan survei oleh KDnuggets, R merupakan bahasa pemrograman yang paling populer pada bidang *data science* pada tahun 2013, 2014, 2015 dan 2016. Artinya, *package* memiliki peluang untuk digunakan oleh banyak *user* di bidang *data science*. Pada versi R Package yang dikembangkan, telah diimplementasikan sebelas algoritma *population based metaheuristic* sebagai berikut: *particle swarm optimization* (PSO), *ant lion optimizer* (ALO), *grey wolf optimizer* (GWO), *dragonfly algorithm* (DA), *firefly algorithm* (FFA), *genetic algorithm* (GA), *grasshopper optimisation algorithm* (GOA), *moth flame optimizer* (MFO), *sine cosine algorithm* (SCA), *whale optimization algorithm* (WOA), and *harmony search* (HS). Pemilihan algoritma yang digunakan berdasarkan pada banyaknya peneliti yang menggunakan algoritma tersebut pada berbagai permasalahan serta telah teruji kehandalan dan stabilitasnya. Untuk memvalidasi *package*, pada penelitian ini digunakan 13 fungsi uji seperti *sphere model*, *Schwefel's Problem 2.22*, *Generalized Rosenbrock's Function*, *Step Function*, dan lain-lain. Berdasarkan eksperimen yang telah dilakukan, dapat ditarik kesimpulan bahwa *package* *metaheuristicOpt* dapat menghasilkan solusi optimal seperti yang ditunjukkan oleh literatur dari setiap algoritma.

Kata kunci: Optimasi, Algoritma *metaheuristic*, Bahasa Pemrograman R, R *Package*.

metaheuristicOpt: An R Package for Optimization Based on Meta-Heuristic Algorithms

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ABSTRACT

Optimization, which is a method to obtain optimal or near-optimal values of objective functions, has been widely used to make a decision in many problem domains, such as engineering, chemical, business, etc. This research is aimed to build an R package that implements eleven methods based on meta-heuristics methods that are inspired from natural phenomena and animal behaviours. Here, R programming language was considered since according to a survey conducted by KDnuggets, it is most popular programming language for data science in 2013, 2014, 2015, and 2016. It means that the package can be possibly used by many users in data science. In this version of the package, we have implemented eleven meta-heuristics algorithms, as follows: particle swarm optimization (PSO), ant lion optimizer (ALO), grey wolf optimizer (GWO), dragonfly algorithm (DA), firefly algorithm (FFA), genetic algorithm (GA), grasshopper optimisation algorithm (GOA), moth flame optimizer (MFO), sine cosine algorithm (SCA), whale optimization algorithm (WOA), and harmony search (HS). We consider these methods since many researches have used them to deal with various problems. Additionally, the methods have proved their reliability and stability. To validate the package, we present 13 benchmarking functions in our experiments such as sphere model, Schwefel's Problem 2.22, Generalized Rosenbrock's Function, Step Function, etc. According to the experiments, we can state that the package metaheuristicOpt produced optimal solutions as indicated by references proposing respective algorithms.

Keywords: Optimization; Meta-heuristics Algorithm; R Programming Language; Software Library; Swarm Intelligence.