

A STUDY ON AN EXTENDED PREY-PREDATOR ALGORITHM

(Kajian ke atas Al-Khwarizmi Lanjutan Mangsa-Pemangsa)

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ABSTRACT

Metaheuristic algorithms are approximate solution methods for optimisation problems which try to improve the quality of solution at hand iteratively in a random way. In recent years, various studies have been conducted in forming new metaheuristic algorithms and modifying or improving existing algorithms to enhance the performance in optimal solution search. In this study, we focus on extending an existing algorithm Prey-Predator algorithm proposed by Tilahun and Ong. Prey-Predator algorithm is a metaheuristic algorithm inspired by interaction between prey and predator among animals. The algorithm imitates the way a predator runs after and hunts its preys where each prey tries to stay with the pack trying to search for hiding place and run away from the predator. In extension of Prey-Predator algorithm, the number of both best preys and predators are increased resulting in a more reasonably exploitation and exploration so that multiple solutions can be achieved. The simulation of nmPPA is carried on ten selected benchmarks test function. nmPPA aimed to solve the problem of objective values being trapped in local optimum and to find multiple solutions at the same time.

Keywords: prey-predator; optimisation; metaheuristics

ABSTRAK

Al-Khwarizmi metaheuristic merupakan penyelesaian hampiran bagi masalah pengoptimuman yang digunakan untuk meningkatkan kualiti penyelesaian sedia ada secara lelan dan rawak. Sejak kebelakangan ini, pelbagai penyelidikan telah dijalankan dalam membina al-Khwarizmi metaheuristic baharu dan mengubah suai atau memperbaiki al-Khwarizmi yang sedia ada bagi meningkatkan prestasi dalam pencarian penyelesaian yang optimum. Dalam kajian ini, penambahbaikan al-Khwarizmi Mangsa-Pemangsa yang dikaji oleh Tilahun dan Ong telah dilakukan. Al-Khwarizmi Mangsa-Pemangsa adalah al-Khwarizmi metaheuristic yang diilhamkan berdasarkan interaksi haiwan antara mangsa dengan pemangsa. Al-Khwarizmi Mangsa-Pemangsa meniru cara pemangsa berlari dan memburu mangsanya yang setiap mangsa cuba untuk berada dan bergerak dalam kumpulan bagi mencari tempat untuk berlindung dan melarikan diri daripada pemangsa. Dalam penambahbaikan al-Khwarizmi Mangsa-Pemangsa, bilangan kedua-dua mangsa dan pemangsa ditingkatkan bagi menghasilkan lebih banyak eksploitasi dan penerokaan yang lebih munasabah supaya pelbagai penyelesaian dapat dicapai. Simulasi nmPPA telah diuji terhadap sepuluh fungsi ujian terpilih bagi kayu ukur terhadap ujian. Simulasi nmPPA bertujuan untuk menyelesaikan masalah nilai objektif yang terperangkap dalam optimum tempatan dan mencari berbilang penyelesaian pada masa yang sama.

Kata kunci: mangsa-pemangsa; pengoptimuman; metaheuristic

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