# Enhancing generality of meta-heuristic algorithms through adaptive selection and hybridization

*Kamal Z. Zamli*
Faculty of Computer Systems & Software Engineering Universiti Malaysia Pahang Kuantan, Pahang, Malaysia

**ABSTRACT**
Solving complex optimization problems can be painstakingly difficult endeavor considering multiple and conflicting design goals. A growing trend in utilizing meta-heuristic algorithms to solve these problems has been observed as they have shown considerable success in dealing with tradeoffs between conflicting design goals. Many meta-heuristic algorithms have been developed to date (e.g. Simulated Annealing (SA), Particle Swarm Optimization (PSO), Teaching Learning based Optimization (TLBO), Grey Wolf Optimizer(GWO) to name a few). Much of these algorithms have adopted elegant metaphors (e.g. heating and cooling of metals in the case of SA and swarming of flocking birds in the case of PSO) from nature in order to derive the mathematical models for generating the solution as well as provides control over their exploration (i.e. sufficient roaming of the search space) and exploitation (i.e. using known knowledge of the surroundings). In line with the no free lunch theorem (), this paper argues that rather than focusing on designing new algorithm, new research should focus on adaptive hybridization of meta-heuristics algorithms in order to compensate the limitation of one with the strengths of another. In this paper, we review the meta-heuristic and hyper-heuristic algorithms in order to highlight the current-state-of-the-arts and suggest areas for future research.

**KEYWORDS**:
meta-heuristics; hyper-heuristics