

# **Group search optimizer: a nature-inspired meta-heuristic optimization algorithm with its results, variants, and applications**

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In this paper, to keep the researchers interested in nature-inspired algorithms and optimization problems, a comprehensive survey of the group search optimizer (GSO) algorithm is introduced with detailed discussions. GSO is a nature-inspired optimization algorithm introduced by He et al. (IEEE Trans Evol Comput 13:973–990, 2009) to solve several different optimization problems. It is inspired by animal searching behavior in real life. This survey focuses on the applications of the GSO algorithm and its variants and results from the year of its suggestion (2009) to now (2020). GSO algorithm is used to discover the best solution over a set of candidate solution to solve any optimization problem by determining the minimum or maximum objective function for a specific problem. Meta-heuristic optimizations, nature-inspired algorithms, have become an interesting area because of their rule in solving various decision-making problems. The general procedures of the GSO algorithm are explained alongside with the algorithm variants such as basic versions, discrete versions, and modified versions. Moreover, the applications of the GSO algorithm are given in detail such as benchmark function, classification, networking, engineering, and other problems. Finally, according to the analyzed papers published in the literature by the all publishers such as IEEE, Elsevier, and Springer, the GSO algorithm is mostly used in solving various optimization problems. In addition, it got comparative and promising results compared to other similar published optimization algorithm.

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