

Heuristic fail in the
process, are too slow



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Heuristic Algorithms or just Heuristics are techniques that are designed to address problems and to find approximated solutions within reasonable timeframes and with low consumption of resources.

Often, Heuristic Algorithms are used when traditional approaches, such as deterministic approaches, fail in the process, are too slow to solve the problem or need a huge amount of resources in order to calculate a meaningful solution. Unlike traditional approaches, Heuristics introduce a certain randomness to the procedure meaning the start of the procedure is randomly selected. Besides, Heuristics act similar to search algorithms at each step of the procedure based on available information to determine which path to follow. As mentioned above, Heuristics are procedures for finding approximated solutions to optimization problems. As Garcia et al. mentioned, these procedures define unconstrained optimization as the D-dimensional minimization problem. Perhaps, one of the more remarkable advantages of Heuristics is the limited amount of information that the algorithm needs to operate. This leverages the flexibility with which the PSO algorithm can adapt to different scenarios and problems, providing also a wide range of application.

It is important at this point to emphasize that Heuristics, in almost all cases, output a good result but at a cost. In order to reach the desired solution within a reasonable timeframe, Heuristic Algorithms sacrifice certain factors such as the accuracy and precision of the results. This allows the algorithm to reach a good solution, very near the optimum. This attribute makes Heuristic Algorithms very suitable to solve problems with lack of computation-time and

with limited use of memory. Despite this advantages, it is not always possible to use them.

Indeed, some other relevant factors are ceded, e. g. the optimality and completeness of the results. Besides, the existence of several results to given problem can cause some complications. On the one side, Heuristics do not guarantee that the best solution will be found but only one solution.

Therefore, it is important to know if it is actually necessary to find the best solution. On the other side, the completeness of the solution set is not guaranteed, meaning only one solution is going to be found and not all of them. Although some inaccuracies exist in the Heuristic Algorithms' results, the popularity and in-terest of this methods are increasing since the 70's. Many studies and developments of new techniques and improvements regarding Heuristics have been made, e.

g. the work of R. Karp in 17, the adaptation made by X. Yang in 35 to improve the results using bats echo system and the modification made by A. Marandi in 20.