A Modified Choice Function Hyper-Heuristic with Boltzmann and Cauchy Functions using the Cooling Schedule

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Abstract : *The resolution of combinatorial optimization problems has always been an interesting field for many researchers, who compete to improve the quality of the previous results in order to get computational and near-optimal solutions. Hyper-heuristics comes to light due to the limitations that heuristics and metaheuristics have presented where new problems appear or even in solving different instances of the same problem. They have two powerful characteristics: 1) they are problem-independent, and 2) they combine several heuristics and/or metaheuristics, that are simple to implement, and take advantage of their best performance to produce a high-quality solution. The Modified Choice Function [2, 3] is a well-known hyper-heuristic that has proven its efficiency in solving various combinatorial optimization problems. However, the configuration of its parameters limits the range of heuristics that can be chosen. The parameters of any algorithm have a substantial impact on its success. Since they govern the algorithm's behavior throughout the search process, their values should be appropriately configured to get the best performance [4]. In this study, we will propose new approaches to control the weight parameters of the Modified Choice Function, based on the Boltzmann and Cauchy Functions using the cooling schedule [1], which improves the diversification in the heuristic choice process. These methods are tested and compared to previous approaches [3] over five problem domains from the combinatorial optimization literature.*

Keywords : *Hyper-heuristics, combinatorial optimization, choice function, modified choice function, Boltzmann Function, Cauchy Function, Cooling Schedule, parameters control, diversification, intensification.*

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