SOLVING HUGE CONTINUOUS OPTIMIZATION PROBLEMS

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Many practical non-convex continuous optimization problems have a very large number of variables. Therefore, solution methods that are able to solve them exactly or approximately are very welcome. Recently we have suggested DE-VNS [1], a new heuristic that combined two well known meta-heuristic approaches: Differential Evolution (DE) and Variable Neighborhood Search (VNS). Both of them attracted a considerable attention by academics as well as by practitioners. In our hybrid heuristic, the idea of neighborhood change is used to estimate the crossover parameter of DE. Family of distributions are introduced, their parameters estimated during the search and then used to control the distances among solutions in the search space. It turned out that DE-VNS is more favorable than the recent DE approaches when tested on standard and large instances from the literature [2], such as Ackley and Rastrigin functions. In this talk I will show that DE-VNS is also able to solve exactly huge problems with up to 10,000 continuous variables. To the best of our knowledge, no attempt has been made so far to solve problems with such a huge number of continuous variables. In order to measure both the method quality and the instance hardness, we introduce terms of dimensional convergence and the dimensional stability. To the best of our knowledge no attempt has been made to evaluate the behavior of a method in as many as 100,000 dimensions, thus rendering our work as an initial one in the area of extremely large scale continuous optimization.

REFERENCES

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2. Kovacevic D., Mladenovic N., Petrovic B., Milosevic P. Comparative Analysis of Continuous Global Optimization Methods, GERAD Technical Report G-2013-41.