

# Squeaky Wheel Optimization On the Multidimensional Knapsack Problem

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Squeaky Wheel Optimization (SWO) was introduced by Joslin and Clements as a modern metaheuristic approach for combinatorial optimization problems. Subsequent research has chosen SWO as a method to hybridize state of the art optimization techniques, such as *Tabu Search* or *Genetic Algorithms*.

Our research focus lies in the realization of a “pure” SWO algorithm for the Multidimensional Knapsack Problem (MKP). We investigated the performance of our SWO for MKP in all detail and report a solution quality level which is equal to the solutions found by Chu/Beasley in 1998 which were computed using a *Genetic Algorithm* with considerable computational effort. Furthermore, we have introduced the *Core Concept*, which is a well known technique in the field of one-dimensional Knapsack Problems (KP), and a time-budgeting feature in order to further shorten the running time. Thus, we have created a combined, highly scalable framework with a focus on favorable running times and a competitive solution quality level.

Finally, we investigate and discuss the chances of SWO on further topics in combinatorial optimization, such as the *travelling salesman problem*.

## Literatur

- [1] David E. Joslin and David P. Clements, “*Squeaky Wheel*” Optimization. *Journal of Artificial Intelligence Research* 10 (1999), pp. 353–373.
- [2] P. C. Chu and J. E. Beasley, *A genetic algorithm for the multidimensional knapsack problem*. *Journal of Heuristics* 4 (1998), pp. 63–86.