

## **A binary particle swarm optimization based on the surrogate information with proportional acceleration coefficients for the 0-1 multidimensional knapsack problem**

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### **Abstrak**

The 0-1 multidimensional knapsack problem (MKP) has been proven it belongs to difficult NP-hard combinatorial optimization problems. There are various search algorithms based on population concept to solve these problems. The particle swarm optimization (PSO) technique is adapted in our study, which proposes a novel PSO algorithm, namely, the binary PSO based on surrogate information with proportional acceleration coefficients (BPSOSIPAC). The proposed algorithm was tested on 135 benchmark problems from the OR-Library to validate and demonstrate the efficiency in solving multidimensional knapsack problems. The results were then compared with those in the other nine existing PSO algorithms. The simulation and evaluation results showed that the proposed algorithm, BPSOSIPAC, is superior to the others in terms of successful runs, average error (AE), mean absolute deviation, mean absolute percentage error, last error, standard deviation, best profit, mean profit, worst profit, AE of the best profit (%), AE of the mean profit deviation.