

KP - Knapsack Problem

June 22, 2023

1 Sets

i	available items	$[0, 5]$
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2 Parameters

v_i	value of packing item i	values
C	total capacity of the knapsack	capacity
w_i	weight of item i	weights

3 Variables

x_i	1 if item i is packed in the knapsack; 0 otherwise	$\in 0, 1$
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4 Model

$$\max \quad \sum_i v_i x_i \quad (1)$$

$$\text{s.t.} \quad \sum_i w_i x_i \leq C \quad (2)$$

4.1 Objective: maximize knapsack value

maximize total value of packed items in the knapsack

4.2 Constraint: knapsack capacity

total weight of packed items cannot exceed the knapsack capacity