

Lavoro adatto a progetto per il corso di Complementi di R.O.

1 The knapsack problem with forfeit sets

This is a variation of the KP.

Some pairs of items are given. For each pair, when both items are selected, a penalties is paid.

Generalization: subsets or items are given and each subset has an associated threshold. A penalty is paid when the number of selected items in the subset exceeds the threshold.

Variation: there is a hard limit on the maximum number of allowed violations (exceeded thresholds).

Consider the case with disjoint subsets and the case with possibly overlapping subsets.

The problem is very difficult: CPLEX is in trouble.

Reference: talk given by Ciriaco d'Ambrosio at ODS 2021 conference. There are references on the KP with conflicts.

The problem looks suitable to develop a dynamic programming algorithm.