Problem Solving Homework (Week 11)

161180162 Xu Zhiming

May 22, 2018

JH Chapter 4

4.3.6.6

DUAL PTAS FOR KNAPSACK
Input: Positive integers $w_1, w_2, \ldots, w_n, b, c_1, \ldots, c_n$ for some $n \in N$, and some positive real number ϵ, $1 > \epsilon > 0$.
Step 1: Regularize the cost and capacity, i.e., $c'_i = c_i/(\max\{c_1, \ldots, c_n\})$, and $b' = b/(\max\{c_1, \ldots, c_n\})$.
Step 2: Sort c_i/w_i, $i = 1, 2, \ldots, n$. Step 3: Use BIN-PTAS on the regularized $c'_1, \ldots, c'_n$ and b'.
But first choose the items i with a high c_i/w_i. Besides the numbers of all bins should never exceed b'.
Output: The best T^* constructed in Step 3.