Proof: The original problem has an unique optimal solution where the function value is zero.

Step 1: If , solving LP since any perturbation on x will change the objective function. If there is a such that obj = 0, we have another solution. Contradiction.

Step 2: From 1 we know that at the optimal solution.

Step 3: Initialize

We have since is not an optimal solution of the original problem.

Solving LP we get

Case 1: If  and is not the optimal solution of the original problem.  > 0. With > 0, we have .

Case 2: = 0, note that . If is optimal, we have  and  = 0. Record this solution.