CSC373 Worksheet 6 Solution

August 12, 2020

1. Notes:

• Linear Programming

- Is a method to achieve the best outcome (such as maximum profit or lowest cost) in a mathematical model whose requirements are represented by linear relationships. [1]
- Is named to make it sound cool for government funding
 - * Like dynamic programming
- Applications
 - * Microeconomics (maximize profits, minimize costs)
 - * Company management

• Standard Form

- Is a form of linear programming
- Are about maximizing, not minimizing ^[2]
- All variables involved are restricted to be non-negative [3]
- All constraints are equalities, with constant, non-negative right-hand [3] sides

Example:

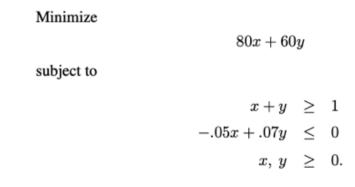
Minimize 80x+60y subject to $x+y-s_1 \ = \ 1$ $-.05x+.07y+s_2 \ = \ 0$

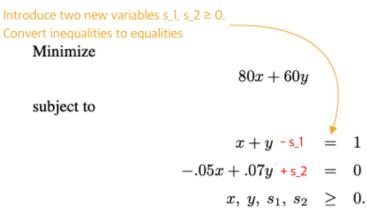
 $x, y, s_1, s_2 \geq 0.$

• Converting Linear Programming to Standard Form

- 1) Mutliply inequality by -1 to get non-negative RHS [3]
- 2) Convert inequalities to equalities by adding or subtracting non-negative slack variables $^{[3]}$
- 3) Resolve unrestrictive variables by writing the variable as the difference of two new non-negative variables [3]

Example:





References:

- 1) Wikipedia, Linear Programming, link
- 2) Instituto de Mathematicas, Standard form for Linear Programs, link
- 3) University of Notre Dame, Converting an LP to standard form, link