

Operations Research

Homework 3

Due in class Wednesday, February 24, 2016

Reconsider Problem 1 from Homework Set 1: *Minimize*

$$z = 8x + 12y$$

subject to

$$5x + 2y \geq 20,$$

$$4x + 3y \geq 24,$$

$$y \geq 2,$$

$$x, y \geq 0.$$

1. Introduce slack variables to write this linear programming problem in the standard form: *Minimize*

$$z = \mathbf{c}^T \mathbf{x}$$

subject to

$$A\mathbf{x} = \mathbf{b}$$

$$\mathbf{x} \geq 0$$

where the coefficients \mathbf{b} , \mathbf{c} , and the decision variables \mathbf{x} are written as column vectors, and A is a matrix of matching dimension.

2. Solve this problem using the simplex method *on paper*.
3. On Homework Set 2, you solved this problem using Pyomo. To extract the values of slack variables, you can use the `lslack()` and `uslack()` attributes on each constraint. Re-run your code, call `lslack()` and `uslack()` on each constraint, and explain the numbers which are returned.

There is no need to re-submit a printout of your program, your homework will be graded on the explanation of the result.