# ORIE 5380, CS 5727: Optimization Methods
# Homework Assignment 4

Due September 28, 12:00 pm

Please submit a single PDF document formatted to print and show all your work clearly. Feel free to scan and submit handwritten work. Do not spend too much time on wordprocessing your answers.

**Question 1**
Consider the linear program

$$\begin{aligned} \max \quad & 2\,x_1 - 6\,x_2 + 2\,x_3 \\ \text{st} \quad & -2\,x_1 - x_2 - x_3 \leq -2 \\ & 2\,x_1 - x_2 + x_3 \leq 1 \\ & x_1, x_2, x_3 \geq 0 \end{aligned}$$

a) Find a feasible solution to the linear program above by using the phase-1 linear program.

b) If there is a feasible solution to the linear program, then find the optimal solution to the linear program above by starting from the feasible solution you found in Part a.

c) Use Excel's solver to verify that your solution in Part b is indeed the optimal solution.

**Question 2**
Consider the linear program

$$\begin{aligned} \max \quad & x_2 \\ \text{st} \quad & 4\,x_1 + x_2 \leq 10 \\ & -x_1 + x_2 \leq -1 \\ & -x_1 - x_2 \leq -3 \\ & x_1, x_2 \geq 0 \end{aligned}$$

a) Find a feasible solution to the linear program above by using the phase-1 linear program.

b) If there is a feasible solution to the linear program, then find the optimal solution to the linear program above by starting from the feasible solution you found in Part a.

c) Use Excel's solver to verify that your solution in Part b is indeed the optimal solution.