

Exercises:

1. Consider the following LP

$$x_1 + 2x_2 - x_3 - 2x_4 \leq 2$$

$$2x_1 + x_2 + x_3 + x_4 \leq 7$$

$$x_1 - x_2 + x_3 + 2x_4 \leq 2$$

$$\text{maximize } x_1 + x_2 + x_4$$

introduce slack variables, put it in tableau form on a spreadsheet and pivot to a solution. Find the value of the objective function and of all variables at the solution point.

2. Write down the dual problem to this one.

Give the solution to it.

3. Suppose we consider the lp defined by the coefficient matrix below but the first constraint is an equality

x1	x2	x3	x4	-b	
1	-2	-7	2	-4	equation 1
2	1	1	1	4	inequality 2
3	-1	1	-1	-1	inequality 3
4	2	3	1	3	inequality 4
1	1	1	1		=objective function

set up a tableau for this problem on a spreadsheet and solve it by pivoting. remember that you must introduce a new variable when any b's are negative.

4. State and prove the duality theorem for linear programming.

5. Set up Strassen's algorithm for multiplying 4 by 4 matrices on a spreadsheet and get it to work.