Math 292: Homework 5

Due Wednesday March 7 in lecture

Hillier and Lieberman 6.1.3, 6.1.7, 6.1.11

Consider the problem,

$$\max \quad 2x_1 + x_2$$

subject to constraints

$$x_1 + x_2 \le 5$$
$$3x_1 + x_2 \le 10$$

and $x_1, x_2 \ge 0$.

(a) Construct the dual problem and graph its feasible region.

(b) Graph the feasible region of the primal problem and list the basic feasible solutions that the simplex method goes to in order, and plot them on the graph.

(c) List the corresponding basic solutions in the dual problem, and plot them on the graph.

(d) How does the optimal solution change if 5 changes to $5 + \varepsilon$ in the first constraint?

(e) How does the optimal solution change in the dual problem if 2 changes to $2 + \varepsilon$ in the first constraint?