AMS 540 / MBA 540 (Fall, 2011) Estie Arkin

Homework Set # 5

Due in class on Tuesday, October 18, 2011.

1). Consider the following LP:

$$\begin{aligned} \min \quad & z = -2x_1 - 3x_2 + x_3 + 12x_4 \\ & -2x_1 - 9x_2 + x_3 + 9x_4 + x_5 = 0 \\ & 1/3x_1 + x_2 - 1/3x_3 - 2x_4 + x_6 = 0 \\ & x_1, x_2, x_3, x_4 \geq 0 \end{aligned}$$

(a). The following anti cycling rule was suggested: Choose an entering variable that maximizes $z_j - c_j$, and break ties in the min ratio rule by favoring the row with least index (row 1 over row 2). Apply this rule to the LP and show that cycling occurs. (This should take 6 pivots.)
(b). Apply one of the anti cycling rules discussed in class to solve this LP. (You should get that the LP is unbounded.)

2). Prove that Simplex will never cycle if an LP has the property that for every degenerate BFS the winner of the min ratio test is unique.

Reminder: The midterm is Thursday October 20 in class, covering material from homeworks 1-5. The exam is *closed* notes. However, you may bring 1 page of notes, written by *you* (not typed or xeroxed). This page will be turned in with the exam.