Due Date: March 11th, 2009
Problems to be turned in: 1,2

1. Solve (graphically), the linear programming problem :

$$\begin{aligned} \text{maximise} \quad & x_1 + x_2 \\ \text{subject to} \quad & 2x_1 + x_2 \leq 4 \\ & x_1 + 2x_2 \leq 4 \\ & x_1 - x_2 \leq 1 \\ & x_i \geq 0,\ i = 1, 2. \end{aligned}$$

2. Find the dual of the following linear programming problem:

$$\begin{aligned} \text{maximise} \quad & x_1 + 2x_2 \\ \text{subject to} \quad & x_1 + 2x_2 = 6 \\ & x_1 - x_2 \leq 3 \\ & x_i \geq 0,\ i = 1, 2. \end{aligned}$$

3. Find the basic solutions of the following system:

$$\begin{aligned} \text{maximise} \quad & x_1 + 2x_2 \\ \text{subject to} \quad & x_1 + 2x_2 + z_1 = 6 \\ & x_1 - x_2 + z_2 = 3 \\ & z_i, x_i \geq 0,\ i = 1, 2. \end{aligned}$$

4. If a basic feasible solution is degenerate then does it correspond necessarily to two different bases ?

5. Let P be the primal linear program in canonical form and D be its dual. Show that the dual of D is P.