# Math 30210 — Introduction to Operations Research

Assignment 11 (each question 6 points; 30 points total)

Due before class, Wednesday November 28, 2007

**Instructions**: Please present your answers neatly and legibly. Include a cover page with your name, the course number, the assignment number and the due date. The course grader reserves the right to leave ungraded any assignment that is disorganized, untidy or incoherent. You may turn this assignment in before class, or leave it in my mailbox (outside 255 Hurley Hall). It can also be emailed; if you plan to email, please check with me to see if the format you plan to use is one that I can read. No late assignments will be accepted. It is permissible (and encouraged) to discuss the assignments with your colleagues; but the writing of each assignment must be done on your own.

**Reading**: Sections 5.1, 5.2, 5.3 and 5.5.

For the first three questions, you should solve the transportation problem using TORA. You should do the last two problems by hand.

1. Taha 5.1A Problem 9 (you should refer back to problem 8 for the data, but there is no need to solve problem 8).

2. Taha 5.2A Problem 7.

3. Taha 5.5A Problem 1.

4. Taha 5.3B Problem 1 parts a) and b), for tableau ii) only.

5. Referring back to the previous problem: set up an initial feasible solution using the least cost method. Then set up the five multiplier equations $u_i + v_j = c_{ij}$ (one for each cell $ij$ corresponding to a basic variable $x_{ij}$ in your initial solution), and solve them, not by setting $u_1 = 0$ but by setting $u_1 = C$ (an unspecified constant). Then use the values you obtain for the $u_i$'s and $v_j$'s to find the objective row entries corresponding to the four remaining non-basic variables (by computing $u_i + v_j - c_{ij}$), and show that the values you get don't depend on $C$. This illustrates the validity of arbitrarily setting $u_1 = 0$; it should be clear that what happens in this small example transfers to the general transportation problem.