EE/Econ 458
Homework #4
Due Wednesday October 5, 2011

1. A two generator system has cost curves ($/hr) of $C_1(P_1)=0.006P_1^2+5P_1+3$, and $C_2(P_2)=0.01P_2^2+4P_2+2$, where P_1 and P_2 are given in MW. The total demand is $P_T=500$ MW. The limits on these generators are $0 \le P_1 \le 300$ and $0 \le P_2 \le 300$.
    a. Determine the unconstrained values of P_1 and P_2 that minimize the cost of supplying the 500 MW, and indicate whether this solution is feasible or not.
    b. For the solution found in (a), how much would the total cost of supply change if the total demand increased to 501 MW for one hour ?
    c. Use the complementary condition (the third condition in the KKT conditions), to identify the values of each Lagrange multiplier associated with the inequality constraints.

2. Starting from the end of the notes "LPSimplex2," (and the slides LPSimple1-2.ppt), take the next iterative step following the exact same approach as described in those notes (and slides). Perform a second iteration just as we did in these notes (and slides) for the first iteration, and then test your solution for optimality. You do not need to perform additional iterations.

3. Starting from the end of the notes "LPSimplex3" (and the end of slides LPSimplex3.ppt), take the next iterative step in the problem described in those notes (and slides). Continue to perform iterations just as we did in these notes (and slides), and test for optimality until you find the optimal solution.

4. Use CPLEX to solve the optimization problem you addressed in problem #2 and #3 of this assignment.