HOMEWORK 3:

1.- Problem 5.2 from textbook.

2.- The equations that follows are material balances for CO_2, SO_2, and N_2 around a gas absorber. *F* is treated as a known variable, but it depends on the case of study.

Solve the material balances for the unknown flow rates S_1, S_2, S_3 using matrices in Excel and use the procedure to find the solution for three different cases of study:

    a) $F = 0.0444$
    b) $F = 0.105$
    c) $F = 0.1422$

$$0.78938 \, S_1 - 0.15 \, S_2 - 0.79255 \, S_3 = 0$$

$$-0.78938 \, S_1 + 0 \, S_2 + 0.79255 \, S_3 = -0.1187F$$

$$0.20983 \, S_1 - 0.85 \, S_2 - 0.20665 \, S_3 = 0$$

3.- Find the new calibration equation for the Flow Meter in APPLICATION page 272 of your textbook. Use the matrix procedure learned in class and compare with the tredline given by Excel.

4.- The variation of heat transfer per unit area (*q*) during the boiling of water under pressure (*P*) has been found to be as follows:

$q\,(MW/m^2)$	1.1	2.4	3.4	3.9	4.0	3.8	3.0	1.2
$p\,(MPa)$	0	1	2	4	6	10	15	20

Using the matrix procedure learned in class, develop a third order polynomial regression between q and p:

$$q(p) = C_o + C_1 p + C_2 p^2 + C_3 p^3$$

Plot your solution and compare with the corresponding Excel tredline.

5.- Problem 6.8 from your textbook.

6.- Consider the following differential equation:

$$\frac{d^2y}{dx^2} - 2y = x$$

with the boundary conditions $y(0) = 0$ and $y(2) = 0.5$. Find the solution of this equation for the interval [0, 1] using central difference formula to approximate the second derivative.

First use ΔX=0.1, find the solution and plot results. Then use ΔX=0.05, find the solution, plot results and compare with the previous solution.

Due date: Tuesday, May 29, 2012

Please submit your Homework on time to the following gmail account:
cgn2420.section1@gmail.com
Use only ONE Excel file, with each problem in a different spreadsheet. Save the file with your NAME and LASTNAME.
In addition print the homework and give it to your professor.
Homework that has not been submitted in this way will not be graded.