University of Massachusetts Lowell
Department of Electrical and Computer Engineering
EECE5200 Computer Aided Engineering Analysis
Problem Set 2

1. Using *gess* evaluate $A^{-1}B$ given

$$A = \begin{bmatrix} -2 & 1 & 2 \\ 2 & 3 & -2 \\ 1 & -2 & 3 \end{bmatrix} \quad B = \begin{bmatrix} -2 & 2 & 4 \\ 3 & 1 & -1 \\ 5 & -4 & 6 \end{bmatrix}$$

2. You are given three port resistor network such that the third port is open-circuit.

$$V_1 = R_{11}I_1 + R_{12}I_2$$
$$V_2 = R_{12}I_1 + R_{22}I_2$$
$$V_3 = R_{31}I_1 + R_{32}I_2$$

where $\underline{V} = (1,2,3)^T$ and $\underline{I} = (1,2)^T$. Determine the unknown resistances R_{ij} such that square of their magnitude is minimum.

3. The following US Census data is to be modeled by the polynomial

$$P(y) = c_1 + c_2 y + c_3 y^2$$

where the variable y is the year.

Year	Population
1900	75,994,575
1910	91,972,266
1920	105,710,620
1930	122,775,046
1940	131,669,275
1950	150,697,361
1960	179,323,175
1970	203,235,298
1980	227,224,681
1990	249,438,712
2000	281,421,906

a. Scale the year by 10 and the population by 100,000. Calculations should be done double precision.

b. Using data from years 1900 to 1980 determine the values of c_n using least-squares. What are the coefficients for the better model based on the square of the error.

c. How well does your model match the population given for 1990 and 2000. State the error and plot using gnuplot displaying the data as points and the model curve as a solid line.