

ChE 400 Applied Chemical Engineering Calculations
Fall 2008
HW-1
Due 09/15/08

Review of Matrices and LAEs

1. Calculate the inverse of the matrix A using Excel (include your spreadsheet in the homework):

$$[A] = \begin{bmatrix} 4 & 3 & 2 & 1 \\ 1 & 2 & 2 & 1 \\ 0 & -1 & 0 & 2 \\ 1 & 2 & 0 & 1 \end{bmatrix}$$

2. The average daily temperature for an area can be approximated by the following function:

$$T = T_{\text{mean}} + (T_{\text{peak}} - T_{\text{mean}}) \cos \left[w(t - t_{\text{peak}}) \right]$$

where:

T_{mean} = the average annual temperature

T_{peak} = the peak temperature

w = the frequency of the annual variation ($=2\pi/365$)

t_{peak} = day of the peak temperature (205 d)

Parameters for US towns are listed below:

City	T_{mean} (°C)	T_{peak} (°C)
Miami, FL	22.1	28.3
Yuma, AZ	23.1	33.6
Bismarck, ND	5.2	22.1
Seattle, WA	10.6	17.6
Boston, MA	10.7	22.9

Develop an M-file that computes the average temperature between two days of the year for a particular city. Test your program for July-August temperature in Yuma.

You must submit a disk with the program (make sure that you label the disk).