Homework 1*†

CS 525

The data for this problem, namely

$$A = \begin{bmatrix} 1 & 2 & 6 \\ 3 & 4 & 5 \end{bmatrix}, B = \begin{bmatrix} 1 & 3 & 5 \\ 4 & 1 & 8 \\ 1 & 1 & 1 \end{bmatrix}, C = \begin{bmatrix} 4 & 1 & -3 \\ 1 & -1 & 1 \end{bmatrix},$$

$$x = \begin{bmatrix} 1 \\ 3 \\ 4 \\ 0 \\ -2 \\ 1 \end{bmatrix}, y = \begin{bmatrix} 1 \\ 2 \\ 1 \\ 5 \\ 2 \\ 3 \end{bmatrix}, z = \begin{bmatrix} 1 \\ 2 \\ 1 \end{bmatrix}, \alpha = 3,$$

can be loaded from `hwk1.mat` by issuing within MATLAB the `load hwk1` command as indicated below. Make sure you print out a diary file containing your MATLAB session as explained in the one-page MATLAB Setup class handout, also available on the web at: http://www.cs.wisc.edu/∼cs525-1.

≫ `diary hwk1.lastname.firstname`

≫ `load hwk1`

≫ `who`

≫ ...

≫ ...

*Each homework is due at the **beginning** of class one week after assigned. No late homework accepted.

†You may wish to refer to CS525 Handout 2, "MATLAB Primer", available from DoIt for details about MATLAB for this assignment.

$\gg$ ...

$\gg$ `clear`

$\gg$ `diary off`

Evaluate the following in MATLAB. More credit will be given for shorter answers.

1. $A + \alpha C$
2. AB
3. v, where $v_i = x_i/y_i$
4. $\min_{i=1,2,\ldots,6} x_i$
5. $w = (x_2, x_4, x_1, x_3, x_5, x_6)$ (row vector)
6. Write a MATLAB m-file "twomult" that generates and prints:

   - The column vectors $A_{.j}z_j$, $j = 1, \ldots, n$, that add up to Az as explained in the introduction to Chapter 2 of the textbok: "Linear Programming with MATLAB".
   - The real numbers $A_{i.}z$, $i = 1, \ldots, m$, that constitute the rows of Az as explained in the textbook.

   Check that both techniques give the same answer Az.

   Make sure that your diary file contains the lines:

   $\gg$ `type twomult.m;`

   $\gg$ `twomult`

   These commands list and execute your m-file "twomult", respectively.