

ECE 317
Summer 2005
Lab Assignment #1

1. Enter the matrix:

$$a = \begin{bmatrix} 11 & 12 & 13 & 14 \\ 21 & 22 & 23 & 24 \\ 31 & 32 & 33 & 34 \end{bmatrix}$$

Determine the following by hand and then verify your answers in Matlab.

For each part, describe in words the portion of the matrix that is being selected.

(A) $a(:, 4)$

(B) $a(1, :)$

(C) $a(:, 1:3)$

(D) $a(2:3, 3:4)$

(E) $a(:, 2:2:4)$

(F) $a(:)$

(G) $b = [a, [\text{eye}(2); \text{ones}(1, 2)]]$

(H) $\text{diag}(a)$

2. Consider the matrix:

$$v = \begin{bmatrix} 1 & x & x^2 \\ 1 & y & y^2 \\ 1 & z & z^2 \end{bmatrix}$$

Enter v with $x = 2$, $y = 2.5$, and $z = 3$

3. Enter the matrix b (which is an 8 x 8 matrix) using the ones() and eye() functions:

$$b = \begin{bmatrix} 7 & 2 & 2\dots & 2 \\ 2 & 7 & 2\dots & 2 \\ 2 & 2 & 7 \dots & 2 \\ \vdots & & & \\ 2 & 2\dots & & 7 \end{bmatrix}$$

Note: all elements other than the diagonal are '2's.

4. Given: $a = \begin{bmatrix} 1 & 2 \\ -3 & -4 \end{bmatrix}$ and $b = \begin{bmatrix} 1 & -3 & 2 \\ -2 & 3 & -1 \end{bmatrix}$

Determine the following by hand and then verify your answers in Matlab.

(A) $a * b$

(B) $3 * a$

(C) $a * b (:, 2 : 3)$

5. Enter the matrix:

$$z = \begin{bmatrix} (4 - 2i)^2 & 2^4 & i^7 \\ -(4^{-3/2}) & (0.36)^{1/2} & (2\pi)^3 \end{bmatrix}$$

Print a matrix containing the real portion of z and a matrix containing the imaginary portion of z.

6. Consider the two matrices a and b:

$$a = \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix} \quad \text{and} \quad b = \begin{bmatrix} 2 & 2 & 2 \end{bmatrix}$$

Determine the following by hand and then verify your answers in Matlab.

(A) $a * b$

(B) $b * a$

(C) $a .* b'$

(D) $b .* a'$

(E) $a ./ b'$

(F) $a .\ b'$

7. Find $y(t) = 4 - (0.5 t)^2$ for $t = -4, -3.9, -3.8, \dots, 3.9, 4$.

Plot $y(t)$ versus t .

8. Solve the following system of linear equations:

$$10x_1 - 8x_2 + 6x_3 = 100$$

$$-2x_1 + 4x_2 + 8x_3 - 10x_4 = 200$$

$$-1x_1 - 3x_2 - 7x_4 = 300$$

$$-x_2 + 2x_3 + 3x_4 = 400$$

Verify that your values for $x_1, x_2, x_3,$ and x_4 satisfy the equations.