

This project is to be done with MATLAB, and you should hand in your printed output. Use the **diary** command to save your work. Edit the saved file to include your name, the problem numbers, and the answers to any questions asked in the problems. Then print your file. For further information on MATLAB, consult the introduction posted on the class website. Whenever you use a new MATLAB command learn about it by using the **help** command; *e.g.*, type **help fplot** to learn about the **fplot** command.

1. Enter the Matrices and column vectors

$$A = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}, \quad B = \begin{pmatrix} 1 & -1 \\ -2 & 4 \end{pmatrix}, \quad C = \begin{pmatrix} 2 & -1 & 0 \\ 1 & 4 & 7 \end{pmatrix}, \quad D = \begin{pmatrix} 3 & -5 & -1 \\ 7 & 6 & 3 \end{pmatrix}$$

$$\mathbf{x} = \begin{bmatrix} 3 \\ 5 \end{bmatrix}, \quad \mathbf{y} = \begin{bmatrix} -1 \\ 1 \end{bmatrix}$$

Note: To enter A type `[1 2; 3 4]`

- (a) Compute (if possible) $A + B$, AC , CA , $A\mathbf{x}$, $B\mathbf{y}$, $4A - 3B$. Note: To multiply matrices A and B type $A * B$.
 - (b) Check that $(A + B)C = AC + BC$, $A(C + D) = AC + AD$, $B(3\mathbf{x} - 2\mathbf{y}) = 3B\mathbf{x} - 2B\mathbf{y}$.
 - (c) Compute A^{-1} , A^3 , $A^2 - 5A - 2I$, A^T . Note: The command for A^{-1} is `inv(A)`, the command for A^3 is `A^3` and the command for A^T is `A'`.
 - (d) Solve $B\mathbf{z} = \mathbf{y}$ with the command `B\y`.
2. Ex.37, p.49, *Lay* Use the command `rref`.
 3. Ex.13, p.101 *Lay*.
 4. Ex.35, p.117 *Lay*.
 5. Ex.9, p.132 *Lay*.
 6. The graph of the cosine function over the interval $-5 \leq x \leq 4$ can be drawn with either of the commands

$$\mathbf{fplot}('cos(x)', [-5, 4])$$
 or
$$\mathbf{fplot}('cos', [-5, 4])$$
 - (a) Graph x^2 over the interval $-1 \leq x \leq 3$. Note: in this context, x^2 should be entered into MATLAB as `x.^2`.
 - (b) Graph $\sin(x^2 + 1)$ over the interval $0 \leq x \leq \pi$.

Note: Your graphs will not be saved by the use of the **diary** command. The command **print** will cause the current graphics window to be printed at your default printer.
 7. Type the following commands and observe the result:

$$x = 0 : .01 : 2 * pi; y = \sin(x); \mathbf{plot}(x, y)$$