Command Window:

The command window is the main window in which you communicate with the MATLAB interpreter. The MATLAB interpreter displays a command $>>$ indicating that it is ready to accept commands from you. You can use the command window as a calculator, or you can use it to call other MATLAB programs (M-files).

Do the following in the command window.

1. Evaluate the expression $a^3 + \sqrt{bd} - 4c$, where a=1.2, b=2.3, c=4.5 and d=4.

2. Consider the two matrices: A = [4 -6; 6 10] B = [6 -13; 3.4 16]

    Find: (a) A+B (b) B^2 (c) AB (d) B^TA^T (e) Replace the second column of A with that of B.

3. Find the solution of the following set of linear algebraic equations:

    $5x + 6y + 10z = 4$

    $-3x + 14z = 10$

    $-7y + 21z = 0$

4. Find the solution of the following set of linear algebraic equation such that $\left\| A\hat{x} - b \right\|_2$ is minimized.

    $5x + 6y + 10z = 4$

    $-3x + 14z = 10$

    $-7y + 21z = 0$

    $2x - y + 45z = 16$

5. Create following two arrays:

    (a) Array of ones with 10 elements

    (b) Array a[1] = 2; a[2] = 3 and a[3] to a[10] are zero

6. Create two arrays indicating marks of students in two subjects. Get average vector of them.

7. Plot the following functions:

    (a) $y = \sin(x) \quad from \quad 0 \le x \le 2\pi$

    (b) $y = x^2 - 10x + 15 \quad from \quad 0 \le x \le 10$

    (c) h[n] = {1, 2, 3, 4, 5}

    (d) h[n] = {1, 2, 3, 4, 5},   with n= -2 to 2

8. Write MATLAB code to verify whether the given vectors are linearly independent or not.

    v1 = [6 0 3 1 4 2];

    v2 = [0 -1 2 7 0 5];

    v3 = [12 3 0 -19 8 -11];

9. For real symmetric matrix

    a) Find the Eigen values and Eigen vectors

    b) Verify properties of Eigen values and Eigen vector.

    Use A = gallery('lehmer',n) to generate real symmetric Matrix.

• M-File Script:

A script file is an external file that contains a sequence of MATLAB statements. Script files have a filename extension .m and are often called M-files. M-files can be scripts that simply execute a series of MATLAB statements, or they can be functions that can accept arguments and can produce one or more outputs.

10. Write MATLAB code for the following:

    I.   Create a column vector with 10 values of temperature in degree centigrade C

    II. Convert each of the temperature values in degree Fahrenheit using the formula: $F = \dfrac{9}{5}C + 32$

III. Make the final matrix with temperature values in C as the first column and in F as the second column.

11. Create a function file for the above problem such that C is taken as input vector and F is an output vector.

Flow Control in MATLAB:

MATLAB has the following flow control constructs:

- if statements

- for loops

- while loops

- break statements

12. The **if, for** and **while** statements need to terminate with an **end** statement.

Examples:

IF:

x=-3;

 if x>0

str='positive';

elseif x<0

str='negative';

elseif x= = 0

str='zero';

else str='error';

end

what is the value of 'str' after execution of above code?

WHILE:

x=-10;

while x<0

x=x+1;

end

What is the value of x after execution of the above loop?

FOR loop:

X=0;

for i=1:10

X=X+1;

 end

The above code computes the sum of all numbers from 1 to 10.

BREAK: The break statement lets you exit early from a for or a while loop:

x=-10;

while x<0

x=x+2;

 if x = = -2

break;

 end

end

13. Determine the probability of 3 heads in 4 tosses of a coin with probability of head being p=0.75. Use a relative frequency interpretation of probability to yield the result.

14. Write a MATLAB program that will add all the numbers corresponding to the even indices of an array. For instance, if the array x was x=[1, 3, 5, 10], then it should return 13 (= 3 + 10). Use that program to find the sum of all even integers from 1 to 1000. Write your program so that it is flexible. That is, you should be able to invoke your program from the command window as follows:

>> y=addeven(x)

where x is the input vector, and y is the sum of all the numbers corresponding to the even indices of x.