Chapter Five
Built−in Functions

Matlab contains a large library of mathematical and logical functions that can be classified as follows:

a) General arithmetic functions.
b) Logarithmic and power functions.
c) Trigonometric functions.
d) Round−off functions.
e) Sorting functions.

5.1 General arithmetic functions

This category involve functions to do simple, yet, repetitive and tedious. They include evaluating average, sum and product values of groups of numbers (matrices).

Average value: it is accomplished using the function (mean):

```
x= [ 3  4  1  2  5 ];          x = [ 2  5   8 ; 1  3  4 ] ;
y = mean( x ) ↵                y = mean( x ) ↵
y = 3                          y = 1.5    4    6
```

Summation of numbers: the sum of a group of numbers is evaluated using (sum):

```
x= [ 3  4  1  2  5 ];          x = [ 2  5   8 ; 1  3  4 ] ;
y = sum( x ) ↵                 y = sum( x ) ↵
y = 15                         y = 3    8    12
```

Cumulative summation: this process generates a matrix having a cumulative sum of a group of numbers using the function (cumsum):

```
x = [ 2  5  8  1  3  4 ] ;          x = [ 2  5  8 ; 1  3  4 ] ;
y = cumsum( x ) ↵                   y = cumsum( x ) ↵
y = 2  7  15  16  19  23            y = 2   5   8
                                        3   8   12
```

Product of numbers: to evaluate the result of multiplying the elements of a group of numbers, the function (prod) is used:

```
x = [ 2  5  8  1  3  4 ] ;
y = prod( x ) ↵
y = 960
```

```
x = [ 2  5  8 ; 1  3  4 ] ;
y = prod( x ) ↵
y = 2   15   32
```

Cumulative product: this process generates a matrix of a cumulative multiplying values using the function (cumprod):

```
x = [ 2  5  8  1  3  4 ] ;
y = cumprod( x ) ↵
y = 2  10  80  80  240  960
```

```
x = [ 2  5  8 ; 1  3  4 ] ;
y = cumprod( x ) ↵
y = 2    5    8
    2   15   32
```

Ex. (5.1): Write Matlab program to display a table of three columns where the first column is the months of the year (numbers from 1 to 12), the second column is the sales of a car company (number of cars sold each month) and the third column is the profits of the company each month. Calculate also the average number of cars sold each month and the total profit of the year.

```
clear,clc
Month=1:12;
No_cars=[3 5 10 6 2 8 6 4 5 3 8 10];
Profits=[12 15 45 30 22 44 33 22 25 40 30 20];
Table=[Month' No_cars' Profits'];
disp(Table)
disp(' ')
avg=mean(No_cars);
tot_Prof=sum(Profits);
disp([avg,tot_Prof])
```