

MATLAB Functions

What is a MATLAB function?

A MATLAB “function” is a MATLAB program that performs a sequence of operations specified in a text file (called an m-file because it must be saved with a file extension of *.m). A function accepts one or more MATLAB variables as inputs, operates on them in some way, and then returns one or more MATLAB variables as outputs and may also generate plots.

To create a new function, we must start with a new m-file using MATLAB editor.

- In the 1'st line of the MATLAB m-file editor, it must put the “function definition,” which has a general structure as below:

function [Out1,Out2,...,OutN] = functionname(In1,In2,...,InM)

Where Out1, Out2,..., OutN are the N output variables and In1, In2,..., InM are the M input variables

- If there is only a single output variable use:

function Out1 = functionname(In1,In2,...,InM)

- Use **Save** or **Save** to save the m-file with name same as ***function name***.

Ex: make a function with name (**volume**) to calculate the volume of sphere

$$V = \frac{4}{3}\pi R^3$$

Sol:

```
Function v = volume(R)
```

```
v = 4/3*pi*R^3;
```

```
end
```

Now to use this function easily write the name(value)
in command window or a new m-file as follow:

```
>> volume(3)
```

```
ans =
```

```
113.0973
```

Or

```
>> R=3;
```

```
>> volume(R)
```

```
ans =
```

```
113.0973
```

Ex: make a function with name (**volarea**) to calculate the volume and surface area of sphere:

$$V = \frac{4}{3}\pi R^3 \quad A = 4\pi R^2$$

Sol:

```
Function [v,a] = volarea(R)
v = 4/3*pi*R^3;
a=4*pi*R^2;
end
```

Save as

volarea

```
>> volarea(3)
```

```
v =
```

```
113.0973
```

```
a =
```

```
113.0973
```

```
>> volarea(4)
```

```
v =
```

```
268.0826
```

```
a =
```

```
201.0619
```