Matlab Programming
Functions [1] [2]

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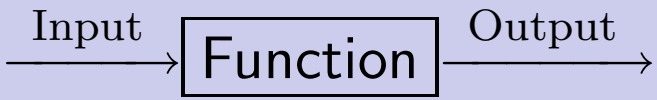
[1] *Matlab, An Introduction with Applications, 2nd ed.* by Amos Gilat
[2] *Matlab Guide, 2nd ed.* by D. J. Higham and N. J. Higham

Functions

A simple function in math $f(x)$ associates a unique number to each value of x. We generalize this idea in this lecture



Methodology

1. Open new m-file
2. On first line write definition of your function

   function [output args] = functionName(input args)

3. Save as `functionName.m`

Example

```
function [Area]=areaOfCircle(radius)
% function [Area]=areaOfCircle(radius)
% This function calculates the area
% of a circle
%
% Inputs: radius
% Output: Area
%
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Area = pi*radius.^2;
```

Type `help areaOfCircle` and see what happens

Example

```
function [Area,Circum]=circleFun(radius)
% function [Area,Circum]=circleFun(radius)
% This function calculates the area
% and circumfrence of a circle
%
% Inputs: radius
% Output: Area, Circum
%
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Area = pi*radius.^2;
Circum = 2*pi*radius;
```

Type `[a,c]=areaOfCircle(3)` and see what happens

Functions vs. Scripts

- Both saved with the extension `.m`
- First line in function file is function definition line
- Variables in a function are local. Variables in a script are global.
- Functions can accept input and return output.
- Functions (should be) are saved as the name of the function followed by a `.m`

Subfunctions

```
function [avg, med] = newstats(u) % Primary function
% NEWSTATS Find mean and median
%
% Inputs: vector of numbers of size at least 2
% Outputs: The average and mean of the input

n = length(u);
avg = mean(u, n);
med = median(u, n);

function a = mean(v, n) % Avg Subfunction
a = sum(v)/n;

function m = median(v, n) % Med Subfunction
w = sort(v); m = (w(n/2) + w(n/2+1)) / 2;
```

Adapted from MathWorks