

Silab Beginners

⇒ Console commands

① `clear;`

→ Removes All variables, function and library from workspace.

② `clc;`

→ Clear window console text.

③ `clf;`

→ Clear current graphics window.

④ `disp(x)`

→ Displays the value of x

* `mprintf()`

→ Displays formatted text.

⑤ `plot(x, y, style)`

vector of
 x
values

vector of
 y
values

string to define color, marker and
line style ('r--')

⑥ `subplot(m, n, p)`

→ Divide current figure into an $m \times n$ grid
set focus on the p -th plot area.

⑦ legend(...)

→ Adds a legend to the plot.

Ex: `plot(t, y, 'b-', t, cos(2 * %pi * 5 * t), 'r-');
legend(["Sine", "Cosine"]);`

Array and Matrix function

① ~~line~~ linspace(a, b, n)

→ Generates a row vector of n equally spaced points from a to b

Ex: `t = linspace(0, 1, 1000);`

② `zeros(n, m)` and `ones(n, m)`

⇒ Create a $[n \times m]$ matrix with 0/1;

`vecZeros = zeros(1, 1000);`

`matOnes = ones(3, 3);`

③ length(x) and size(x)

↙
return max
dimension

↘
return the dimension of x as a
two element vector [row, column]

④ `sprintf`

→ Returns a formatted string.

```
str = sprintf("Frequency in %f Hz", 100);  
disp(str);
```

Mathematical function

`sin(x), cos(x)` → Compute sine & cosine in radians.

`exp(x), log(x)` → exponent & natural logarithm.

`abs(x)` → Absolute value

`sign(x)` → Return -1, 0, or 1.

`round(x)` → round to nearest integer

`prod(x)` → product of all element in x

`sum(x)` → sum of all element in x

`min(x)` → minimum ~~~~~ x

`max(x)` → maximum ~~~~~ x

Control statement

① if condition then // statement

elseif condition then // statement

else // statement

end

② for i = 1:10 // 1 → 10 statement

③ while condition do // statement

④ function y = my_function(x)

// compute something with x

⑤ $y = x \cdot 12$

↘ element wise operation

end function

Signal processing Functions

② $\text{filter}(b, a, x)$

\Rightarrow implements a digital filter on signal x using difference equations:

$$y[n] = \frac{1}{a(1)} (b(1)x[n] + b(2)x[n-1] + \dots - a(2)y[n-1] - \dots)$$

$b \rightarrow$ Numerator (feed forward) coefficients.

$a \rightarrow$ Denominator (feedback) x (often $a(1)$ is 1)

$x \rightarrow$ input signal

$$y = \text{filter}(b, a, x)$$

② $\text{conv}(x, h)$

\rightarrow Compute the convolution of x with h

$$y_{\text{conv}} = \text{conv}(x, h)$$

③ $\text{fft}(x)$ and $\text{ifft}(x)$

purpose \Rightarrow
 $\text{fft}(x) \rightarrow$ Compute FFT of x
 $\text{ifft}(x) \rightarrow$ Compute inverse FFT

$$\begin{aligned} x &= \text{fft}(x); \\ x_{\text{reconstructed}} &= \text{ifft}(x); \end{aligned}$$