

Matlab intro

- Introduce general layout

IDE

File browser

command history

editor

command window

- Command window & basic variables

`a = 1`

`a = 1;`

`b = a + 1;`

`disp(b)`

`fprintf('0%f/n', b)`

workspace

weak vs. strong type

arrays

- `a = zeros(5, 1)` → index is 1 to n

`a(3) = 2`

`a(7) = 1` → extends

cell arrays, `cell(2, 1)`

- Scripts

Command window cells

Variables in command window scope

- Functions
 - multiple functions in one file
 - Only top function is externally visible
 - Variable scope
 - IDE Debugger

- Variable comparison
 $=$, $<$, $>$, \leq , \geq , \neq

Do not use $=$ for numbers, use
 $\text{abs}(a-b) < \text{tol}$

$\&\&$ logical and w/ short circuiting
 \parallel logical or w/ short circuiting

- Branching / Conditional Statements
if - else if - else - end

switch - case - otherwise - end

- Loops
for i = 1:10

end

1:2:10

10:-1:-1

a = 2:4:20

for i = a

disp(i)

end

while expr

continue so long as
expr is true,

end

- Basic plotting

plot(x, y)

plot3(x, y, z)

loglog(x, y)

semilogx(x, y)

semilogy(x, y)

- Handles (aka to pointers)

1) Anonymous functions

f = @(x, y)(sin(x) + y)

f(4, 3) ≈ 2.2432

format long

array input

$$f([1 \ 3], [3 \ 1]) \approx (3, 8415 \ 1, 1411)$$

be careful!
 $f([1 \ 3], [3 \ 1]')$

2) function handles
 $f = @ \sin$

Useful as input
 $\text{newton}(@ \sin, 3, 1e-6)$
 $\text{newton}(@ \cos, 3, 1e-6)$

- Pointwise operations
by default all operations are
vector-like operations, (more later)

$a = 1:3$ \leftarrow square each element
 $a^2 \rightarrow$ Error (Travis hint)
 $a.^2 \rightarrow 1 \ 4 \ 9$

- Comments & Formatting
Style guide.