

Jan 29, 2020 Iterative Matlab Basic Operation

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Ref: Essential Matlab for Engineers and Scientists

Ref: https://www.mathworks.com/help/matlab/matlab_prog/live-editor-introduction.html (Interactive Matlab Editor)

- This method shows the results of code line by line like Jupyter notebook
- I will use matlab for discrete choice model to change matlab code to python
- (Control + Alt + Enter) Code line
- (Alt + Enter) Text Line
- disp(something), print is not working in matlab command

```
for i = 1:5, disp(i), end
```

```
1
2
3
4
5
```

Newton's method

```
a = 2;
x = a/2;
disp(['sqrt(a) for a=', num2str(a)])
```

```
sqrt(a) for a=2
```

```
for i = 1:6
    x = (a + a/x)/2;
    disp(x)
end
```

```
2
1.5000
1.6667
1.6000
1.6250
1.6154
```

```
disp('Lots of things to do, there is no free lunch')
```

Lots of things to do, there is no free lunch

```
disp(sqrt(2))
```

1.4142

Fatorial!

```
n = 10;  
fact = 1;  
  
for k = 1:n  
    fact = k*fact;  
    disp([k fact])  
end
```

1	1
2	2
3	6
4	24
5	120
6	720
7	5040
8	40320
9	362880
10	3628800

If-else

```
x=2;  
if x<0 disp('jikhon'), else disp('handsome')  
end
```

handsome

Multiple ifs verse elseif

- rand : random number in the interval [0, 1)

```
bal = 15000 * rand
```

bal = 1.4363e+04

```
if bal < 5000
    rate =0.01;

elseif bal <10000
    rate =0.02;

else
    rate = 0.03;
end
```

```
disp(rate)
```

```
0.0200
```

```
newbal = bal + rate*bal
```

```
newbal = 1.4650e+04
```

```
format bank
disp(newbal)
```

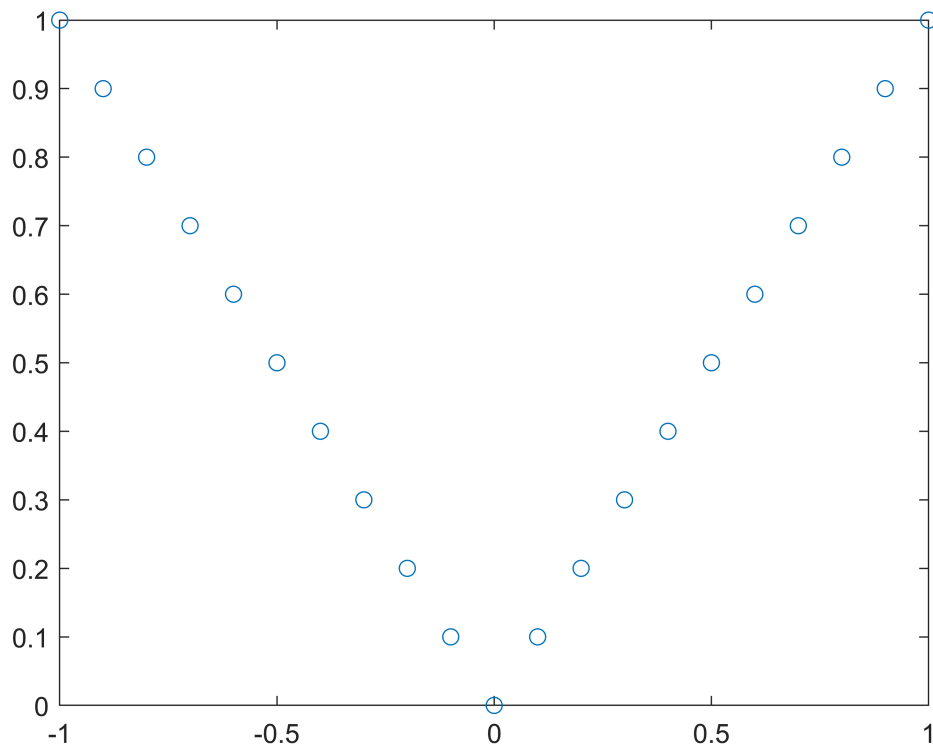
```
14649.85
```

Common Function

```
sqrt([1 2 3 4])
```

```
ans = 1×4
    1.00    1.41    1.73    2.00
```

```
x = -1:.1:1;
plot(x, abs(x), 'o')
```



Logic Operation

- 0 = false, 1 = true

```
r=1;
r <= 0.5
```

```
ans = logical
     0
```

```
s = 1:5;
s <= 3
```

```
ans = 1x5 logical array
     1     1     1     0     0
```

```
a = 1:5;
b = [ 0 2 3 4 5];
a == b
```

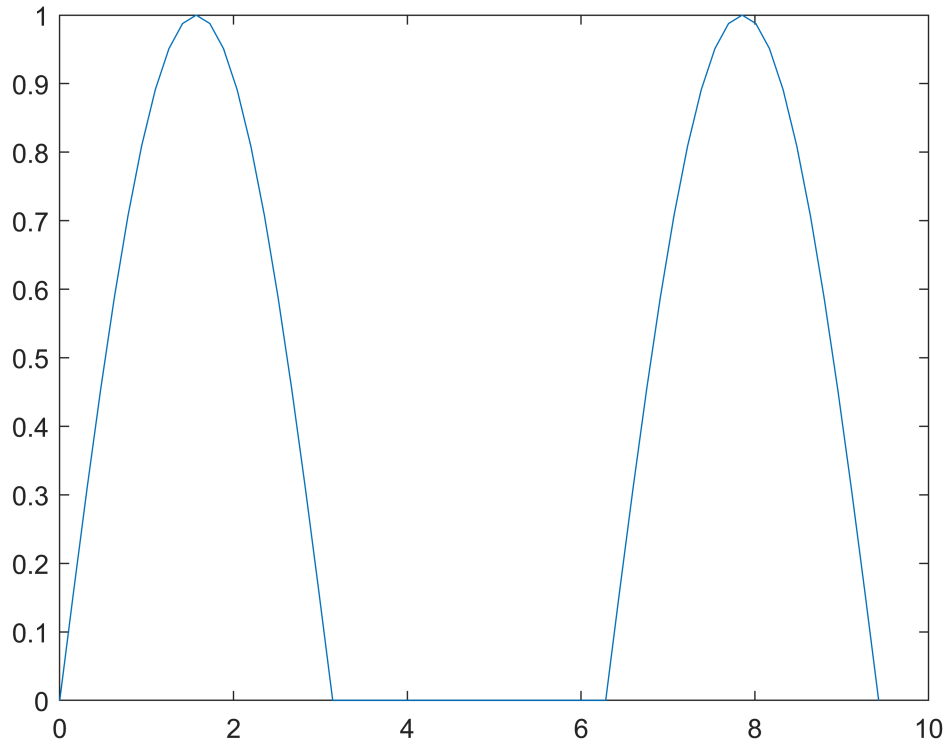
```
ans = 1x5 logical array
     0     1     1     1     1
```

```
x = 0: pi/20 : 3*pi;
```

```

y = sin(x);
y = y.*(y > 0);
plot(x, y)

```



Elemental-Wise Matrix Product

```

c = [ 1 2 3; 4 5 6; 7 8 9];
c

```

```

c = 3×3
    1.00    2.00    3.00
    4.00    5.00    6.00
    7.00    8.00    9.00

```

```

d = [1 0 0 ; 0 1 0; 0 0 1];
d

```

```

d = 3×3
    1.00     0     0
     0     1.00     0
     0     0     1.00

```

```

total = c.*d

```

```

total = 3×3
    1.00     0     0
     0     0     0
     0     0     0

```

0	5.00	0
0	0	9.00

```
a = [1 2; 3 4];
x = [5 6];
a = [a; x] % row dimension addition
```

```
a = 3x2
    1.00    2.00
    3.00    4.00
    5.00    6.00
```

Duplicating rows and columns

```
a = [1 2 3];
b = repmat(a, [3 1])
```

```
b = 3x3
    1.00    2.00    3.00
    1.00    2.00    3.00
    1.00    2.00    3.00
```

```
b(:,2)=[] % empty in column 2, remove column 2
```

```
b = 3x2
    1.00    3.00
    1.00    3.00
    1.00    3.00
```

Elementary matrix

```
e = eye(3) % Identity Matrix
```

```
e = 3x3
    1.00    0    0
    0    1.00    0
    0    0    1.00
```

```
diag(e)
```

```
ans = 3x1
    1.00
    1.00
    1.00
```

```
a =[1 2 3; 4 5 6];
a*2 % a*a matrix operation
```

```
ans = 2x3
    2.00    4.00    6.00
    8.00   10.00   12.00
```

```
a.^2 % . means element-wise operation
```

```
ans = 2x3  
      1.00      4.00      9.00  
     16.00     25.00     36.00
```

```
a =[1 2 3; 4 5 6; 7 8 9];  
a
```

```
a = 3x3  
      1.00      2.00      3.00  
      4.00      5.00      6.00  
      7.00      8.00      9.00
```

```
for v = a  
    disp(v')  
end
```

```
      1.00      4.00      7.00  
      2.00      5.00      8.00  
      3.00      6.00      9.00
```