

Octave.

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GNU Octave — , MATLAB  
[`@octave:~`].

⌈:

- , , 2D/3D-
- , GNU/Linux, macOS, BSD Microsoft
- Windows.
- , Matlab

diary on. Octave ,  
`2 * 6 + (7 - 4)^2` ( . [`@fig:001`])

```
octave:1> diary on
octave:2> diary
octave:3> diary
octave:4> 2*6+(7-4)^2
ans = 21
```

Figure 1:

$2 * v + 3 * u.$   $u$   $A.$   $v$   
`dot()` `cross()`.  
`norm()` ( . [`@fig:002`])

```
octave> u = [1 -4 2]
u =
    1   -4    2

octave> v = [12 -6 8]
v =
   12   -6    8

octave> A = [1 2 -3; 2 4 6; 1 1 1]
A =
    1    2   -3
    2    4    6
    1    1    1

octave> w = [2; 1; -1]
w =
     2
     1
    -1

octave> D=det(A)
D =
   -18

octave> D=det(A_w)
D =
     2

octave> cross(u,v)
ans =
     2
    18
     8

octave> norm(A)
ans = 7.0000

octave> [u; norm(A)]
ans =
     1     -4     2
     7
```

Figure 2:

$$- \quad u \quad v \quad u \quad v \left( \begin{array}{c} \text{.} \end{array} \text{ [-@fig:003]} \right):$$

```
octave> out(1)
ans =
     3     5

octave> u = [7 2]
u =
     7     2

octave> proj = det(u,v)/norm(v)^2*v
proj =
   4.4000   1.1000
```

Figure 3:

$$B. \quad A * B, B^T * A \left( \begin{array}{c} \text{.} \end{array} \text{ [-@fig:004]} \right)$$

```
octave> B = [2 2 5; 4 2 -3; 6 1 -1; 8]
B =
     2     2     5
     4     2    -3
     6     1    -1
     8

octave> A*B
ans =
     2     1    -1    16
     2     1    -1    16

octave> B'*A
ans =
     2     2     2
    16    16    16
```

Figure 4:

$$2 * A - 4 * I, \quad I$$

$$A \left( \begin{array}{c} \text{.} \end{array} \text{ [-@fig:005]} \right)$$

$$x, \quad y = \sin x \quad \left( \begin{array}{c} \text{.} \end{array} \text{ [-@fig:006], [-@fig:007]} \right)$$

```

%[1000 200 300 400 500]
ans =
     0     4     8
     4     8    12
     8    12    16

octave>plot(x, h(x))
ans = 0
octave>plot(x, h(x))
ans =
 0.0007 -0.0111 2.0000
 0.0111 0.0007 1.0000
 0.0111 0.0007 0

octave>plot(x, h(x))
ans =
 0.0111 0
 0.0111 0.0007
 0.0111 0.0007
octave>plot(x, h(x))
ans = 0

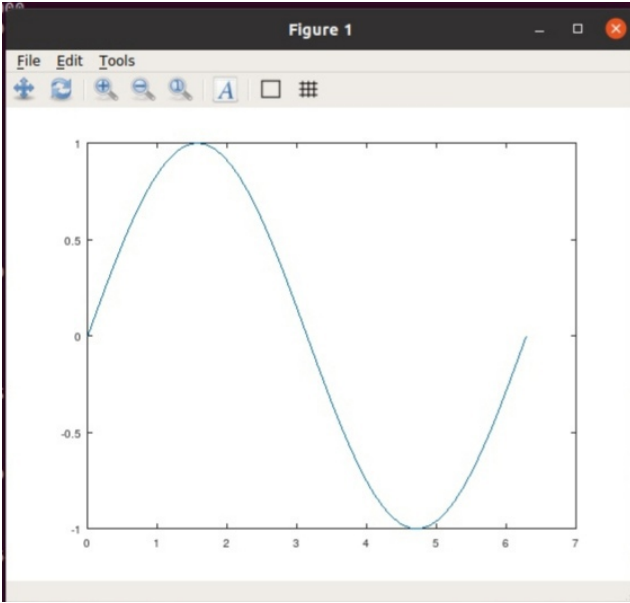
```

Figure 5:

```

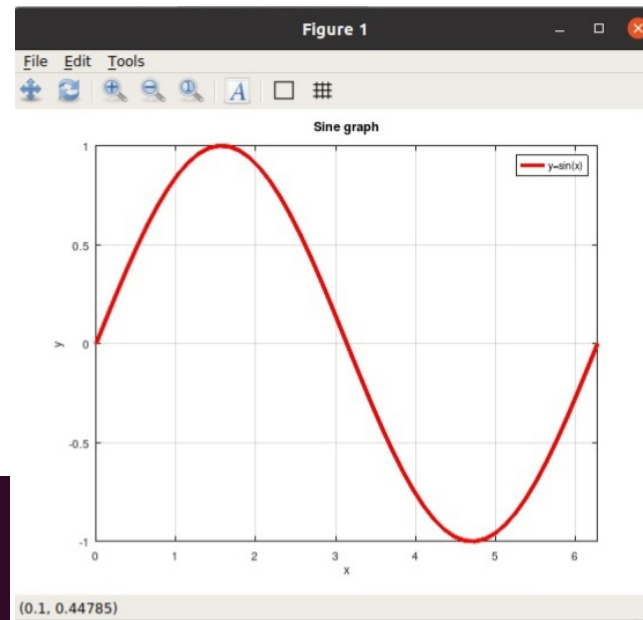
octave>plot(x, h(x), 'r');
octave>plot(x, h(x), 'b');
Columns 1 through 11:
 0 0.0111 0.0111 0.0111 0.0007 0.0007 0.0007 0.0007 0.0007 0.0007 0.0007
Columns 11 through 21:
 0.0007 0.0007 0.0007 0.0007 0.0007 0.0007 0.0007 0.0007 0.0007 0.0007 0.0007
Columns 21 through 31:
 0.0007 0.0007 0.0007 0.0007 0.0007 0.0007 0.0007 0.0007 0.0007 0.0007 0.0007
Columns 31 through 41:
 0.0007 0.0007 0.0007 0.0007 0.0007 0.0007 0.0007 0.0007 0.0007 0.0007 0.0007
Columns 41 through 51:
 0.0007 0.0007 0.0007 0.0007 0.0007 0.0007 0.0007 0.0007 0.0007 0.0007 0.0007
octave>plot(x, h(x))

```



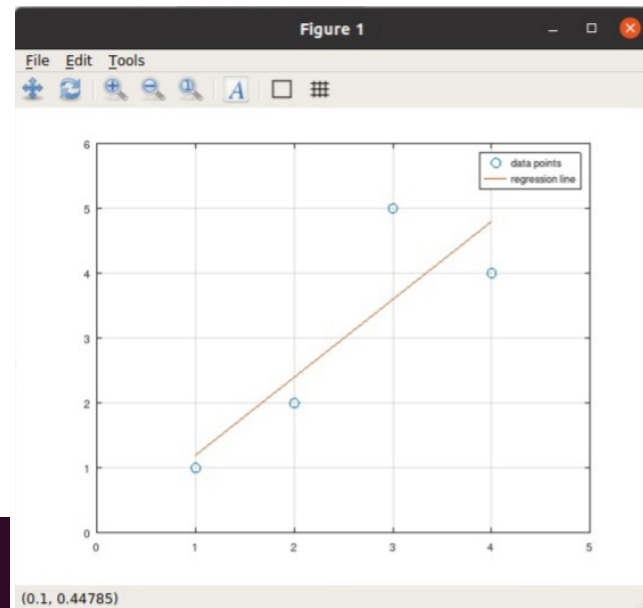
( . [-@fig:008], [-@fig:009]) , , ,

```
octave:31> plot(x,y,'r','linewidth',3)
octave:32> axis([0 2*pi -1 1])
octave:33> grid on
octave:34> xlabel('x')
octave:35> ylabel('y')
```



hold on.

```
octave:42> plot(x,y,'o')
octave:43> hold on
octave:44> plot(x,1.2*x)
octave:45> grid on
octave:46> axis([0 5 0 6])
octave:47> legend('data points', 'regression line');
```



$y = x^2 * \sin(x)$ .

`plot(x, x^2*sin(x))`

[-@fig:013])

```
octave:42> plot(x,y,'o')
octave:43> hold on
octave:44> plot(x,1.2*x)
octave:45> grid on
octave:46> axis([0 5 0 6])
octave:47> legend('data points', 'regression line');
octave:48> clear
octave:49> clf
octave:50> x = linspace(-10, 10, 100);
octave:51> plot(x, x.^2*sin(x))
error: for x/y, only square matrix arguments are permitted and one argument must be scalar. Use .^ for elementwise power.
octave:52> plot(x, x.^2.*sin(x))
octave:53> print graph2.png -png
octave:54> print ('graph2.pdf' '-dpdf')
```

$$y = x^2 * \sin(x)$$

$$\sum_n^{10000000} 1/n^2$$

( loop\_for.m) ( loop\_vec.m).

```
octave:63> loop_for
Elapsed time is 0.126218 seconds.
octave:64> s
s = 1.6449
octave:65> loop_vec
Elapsed time is 0.00279093 seconds.
octave:66> s
s = 1.6449
```

Figure 6:

Octave.