



# Programarea si utilizarea calculatoarelor II

---

(1) Elemente de baza ale limbajului  
MATLAB

# Reprezentari grafice

---

De foarte multe ori pentru a avea o imagine clara asupra rezultatelor unui algoritm, in afara de afisarea valorilor calculate, determinate, o reprezentare grafica este necesara. Ea devine obligatorie, atunci cand, volumul de date este foarte mare si devine imposibil de analizat sau cand forma rezultatelor nu sugereaza nici un fel de "caracteristica".

Sa se calculeze valorile functiei:

$$f(x, y) = (x-1)^2 - (y+1)^2$$

Unde  $-6 \leq x \leq 6$      $-6 \leq y \leq 6$



# Reprezentari grafice

Command Window

 New to MATLAB? Watch this [Video](#), see [Demos](#), or read [Getting Started](#).

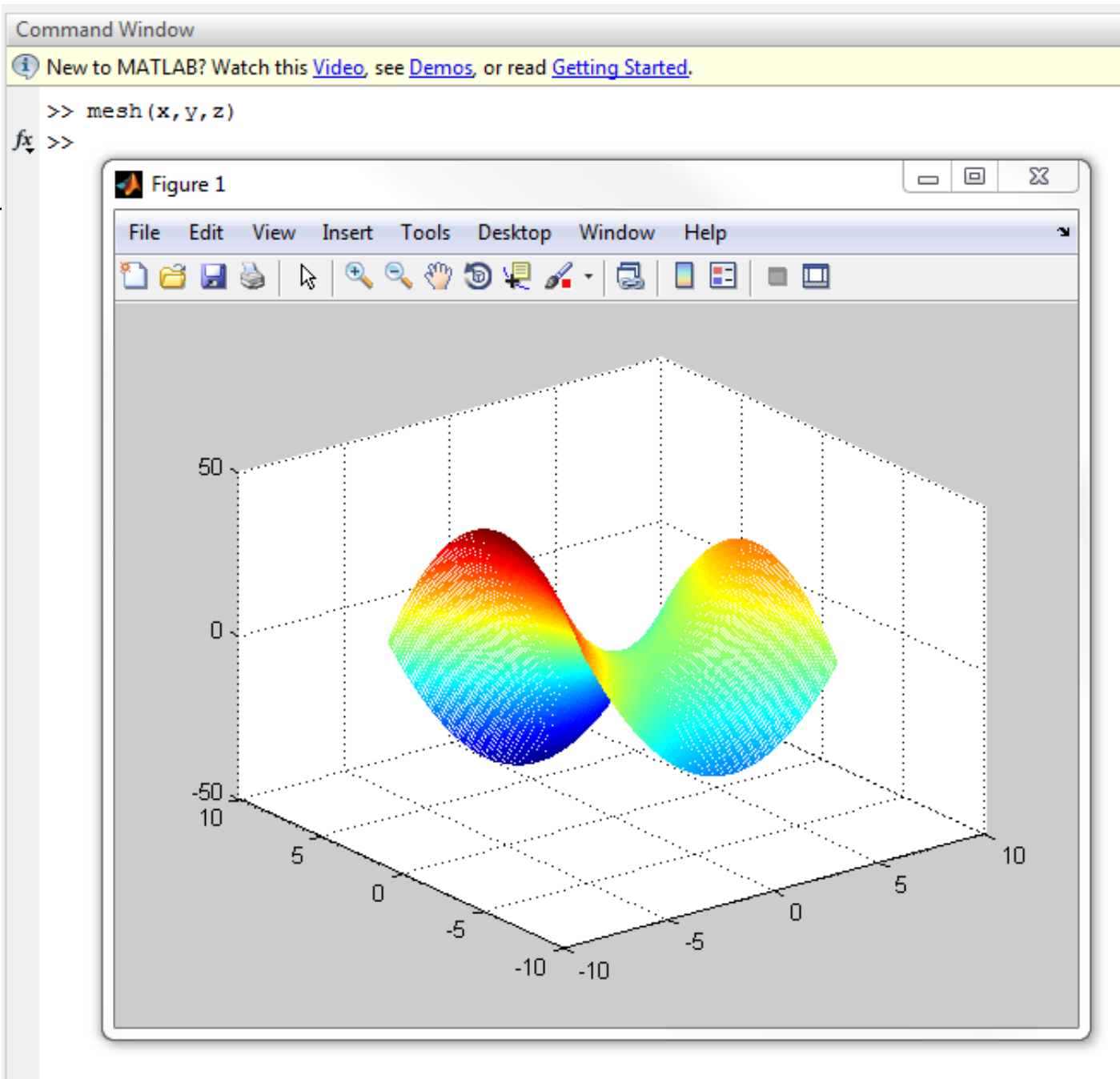
```
>> z=(x-1).^2-(y+1).^2
```

```
z =
```

```
Columns 1 through 9
```

24.0000	22.6100	21.2400	19.8900	18.5600	17.2500	15.9600	14.6900	13.4400
24.9900	23.6000	22.2300	20.8800	19.5500	18.2400	16.9500	15.6800	14.4300
25.9600	24.5700	23.2000	21.8500	20.5200	19.2100	17.9200	16.6500	15.4000
26.9100	25.5200	24.1500	22.8000	21.4700	20.1600	18.8700	17.6000	16.3500
27.8400	26.4500	25.0800	23.7300	22.4000	21.0900	19.8000	18.5300	17.2800
28.7500	27.3600	25.9900	24.6400	23.3100	22.0000	20.7100	19.4400	18.1900
29.6400	28.2500	26.8800	25.5300	24.2000	22.8900	21.6000	20.3300	19.0800
30.5100	29.1200	27.7500	26.4000	25.0700	23.7600	22.4700	21.2000	19.9500
31.3600	29.9700	28.6000	27.2500	25.9200	24.6100	23.3200	22.0500	20.8000
32.1900	30.8000	29.4300	28.0800	26.7500	25.4400	24.1500	22.8800	21.6300
33.0000	31.6100	30.2400	28.8900	27.5600	26.2500	24.9600	23.6900	22.4400
33.7900	32.4000	31.0300	29.6800	28.3500	27.0400	25.7500	24.4800	23.2300

# Repre- zentari grafice



# Plotarea functiilor elementare

Sa se ploteze graficul functiei  $y = \sin(3\pi x)$  pentru  $x \in (0,1)$

## Command Window

 New to MATLAB? Watch this [Video](#), see [Demos](#), or read [Getting Started](#).

```
>> N = 10; h = 1/N; x = 0:h:1
```

```
x =
```

```
Columns 1 through 7
```

```
0 0.1000 0.2000 0.3000 0.4000 0.5000 0.6000
```

```
Columns 8 through 11
```

```
0.7000 0.8000 0.9000 1.0000
```

```
>> y=sin(3*pi*x)
```

```
y =
```

```
Columns 1 through 7
```

```
0 0.8090 0.9511 0.3090 -0.5878 -1.0000 -0.5878
```

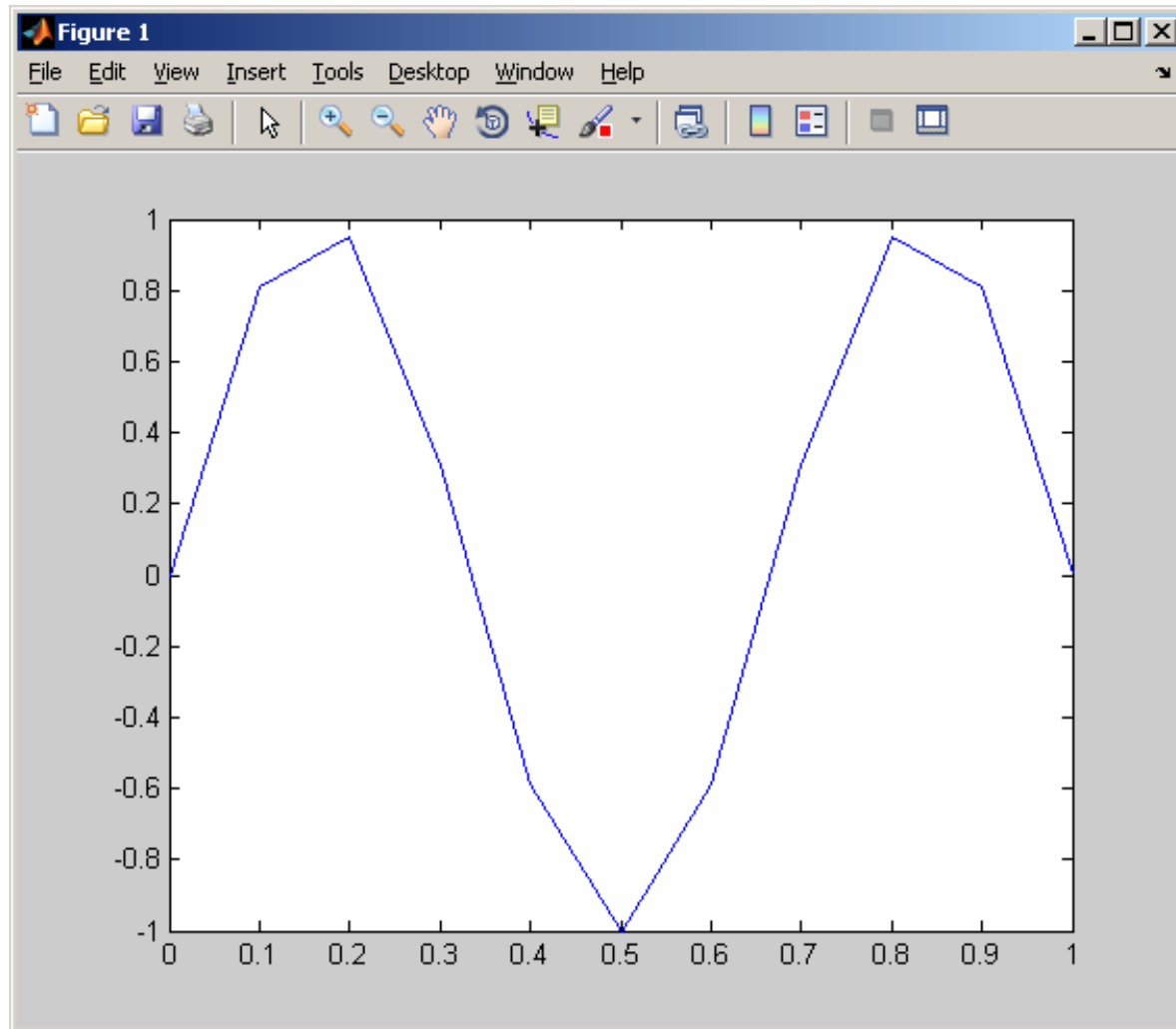
```
Columns 8 through 11
```

```
0.3090 0.9511 0.8090 0.0000
```

```
>> plot(x,y)
```

```
>> |
```

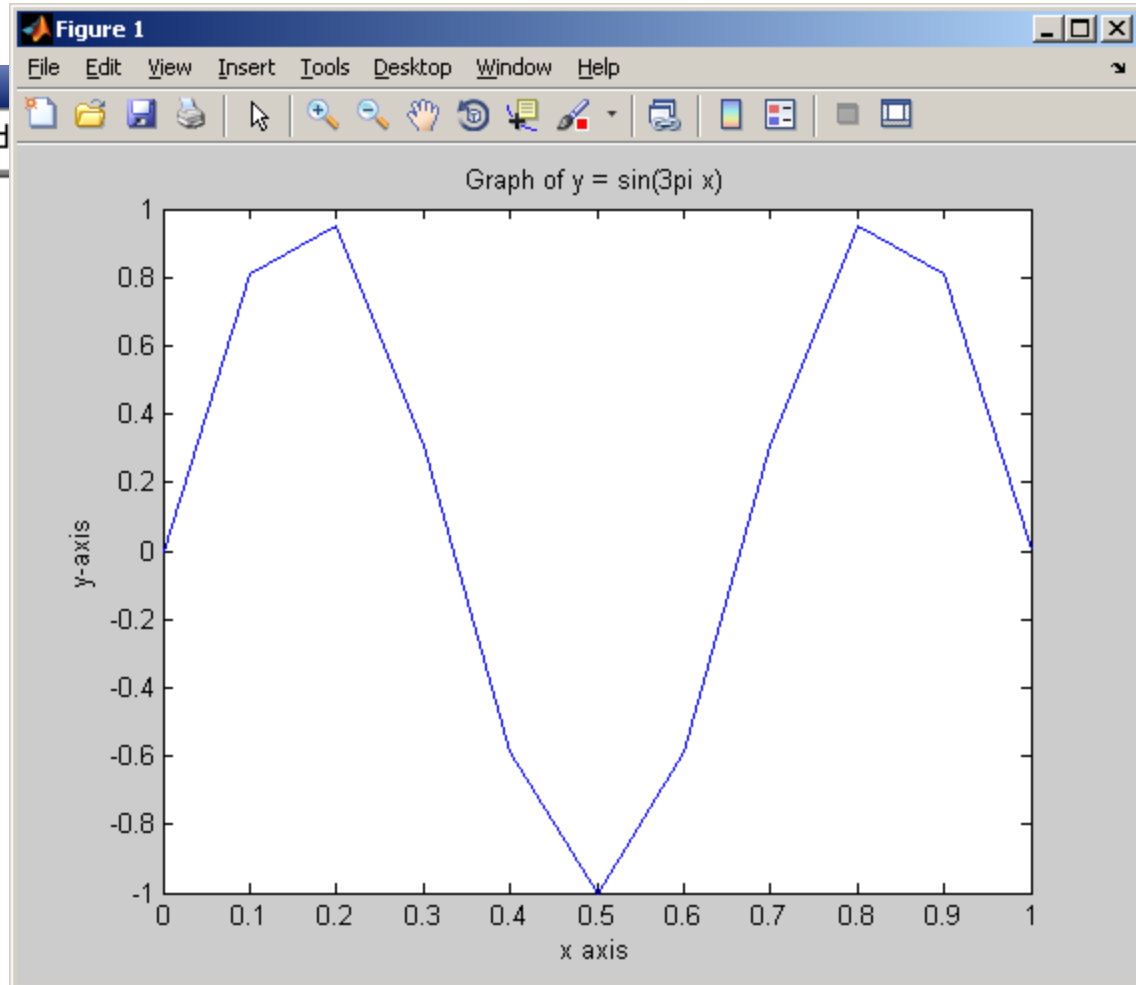
# Plotarea functiilor elementare



# Plotarea functiilor elementare

## Notatii pe grafice

```
Command Window  
New to MATLAB? Watch this Video, see Demos, or read  
>> title('Graph of y = sin(3pi x)')  
>> xlabel('x axis')  
>> ylabel('y-axis')  
>> |
```



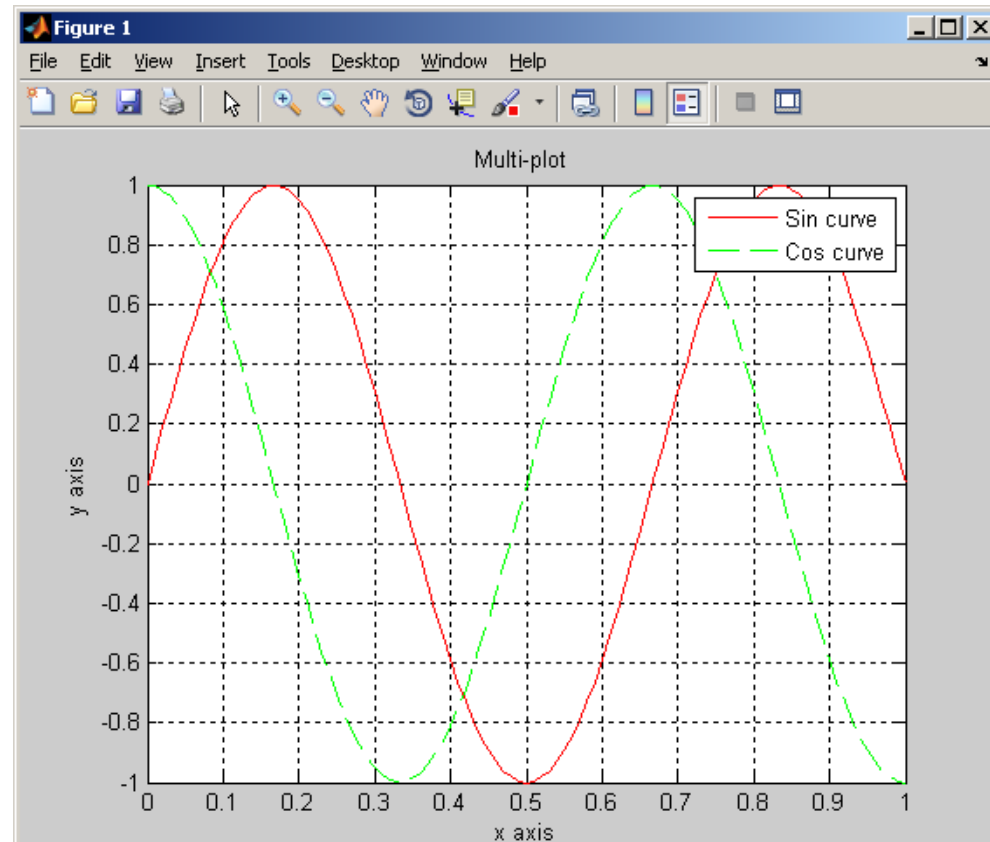


# Plotarea functiilor elementare

## Command Window

 New to MATLAB? Watch this [Video](#), see [Demos](#), or read [Getting Started](#)

```
>> N = 100; h = 1/N; x = 0:h:1;
>> y = sin(3*pi*x); plot(x,y)
>> grid
>> plot(x,y,'r-',x,cos(3*pi*x),'g--')
>> legend('Sin curve','Cos curve')
title('Multi-plot ')
xlabel('x axis'), ylabel('y axis')
grid
>> |
```



# Plotarea functiilor elementare

---

La fiecare comanda plot, fereastra grafica este initializata si se incepe un nou grafic. Daca se doreste reprezentarea mai multor elemente pe acelasi grafic, din comenzi diferite, dupa realizarea primului grafic, se foloseste functia:

**Hold**

Iar pentru anulara efectului acesteia:

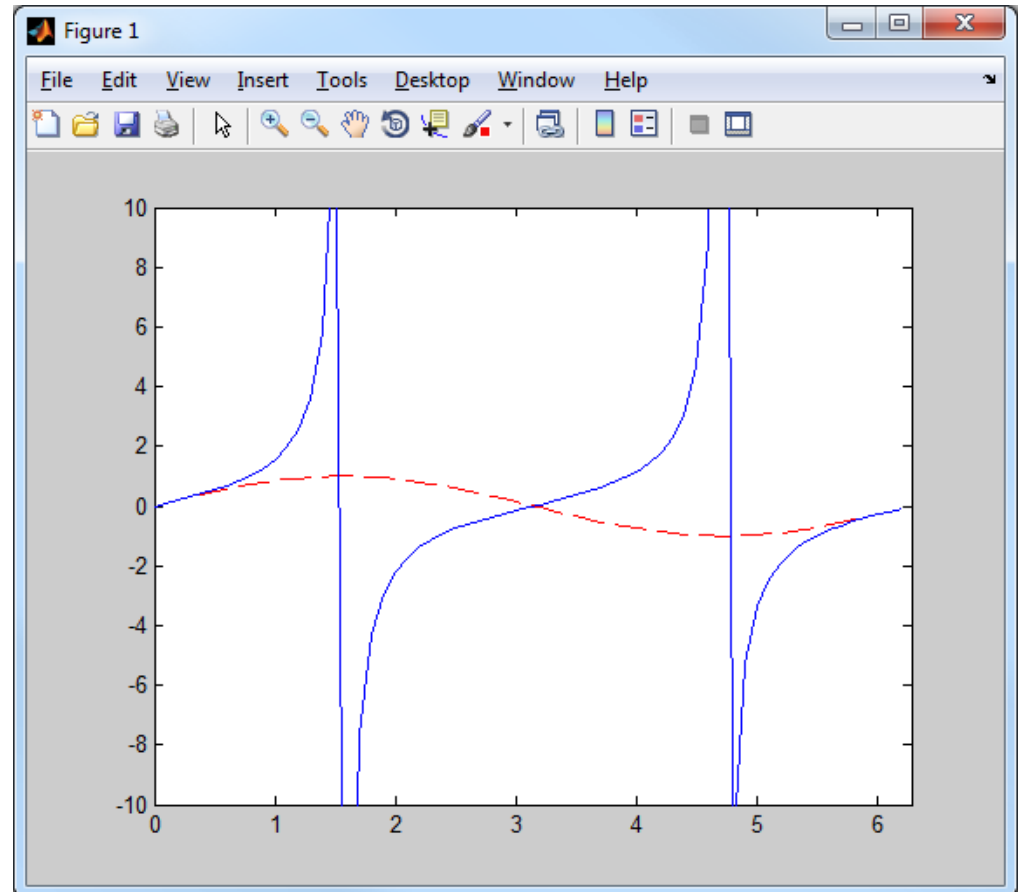
**Hold off**

# Plotarea functiilor elementare

## Command Window

 New to MATLAB? Watch this [Video](#), see [Demos](#), or read [Getting Started](#).

```
>> x=0:0.1:2*pi;  
>> y=sin(x);  
>> plot(x,y,'r--')  
>> hold on  
>> y=tan(x);  
>> plot(x,y)  
>> axis([0,2*pi,-10,10])  
fx  
>>
```



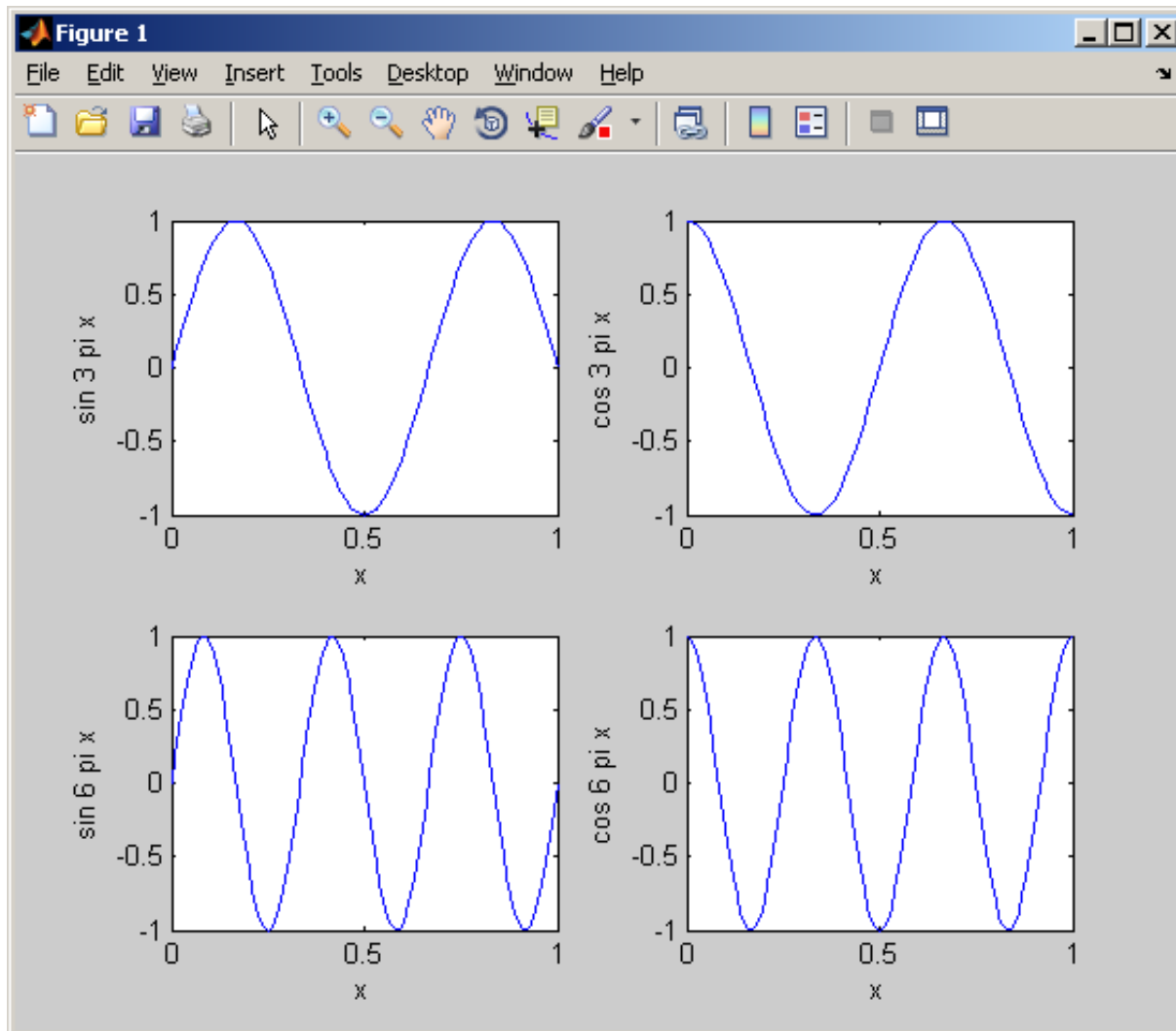
# Plotare - subploturi

## Command Window

**i** New to MATLAB? Watch this [Video](#), see [Demos](#), or read [Getting Started](#)


```
>> N = 100; h = 1/N; x = 0:h:1;
>> y = sin(3*pi*x);
>> subplot(221), plot(x,y)
xlabel('x'), ylabel('sin 3 pi x')
subplot(222), plot(x,cos(3*pi*x))
xlabel('x'), ylabel('cos 3 pi x')
subplot(223), plot(x,sin(6*pi*x))
xlabel('x'), ylabel('sin 6 pi x')
subplot(224), plot(x,cos(6*pi*x))
xlabel('x'), ylabel('cos 6 pi x')
>> |
```

# Plotare - subploturi

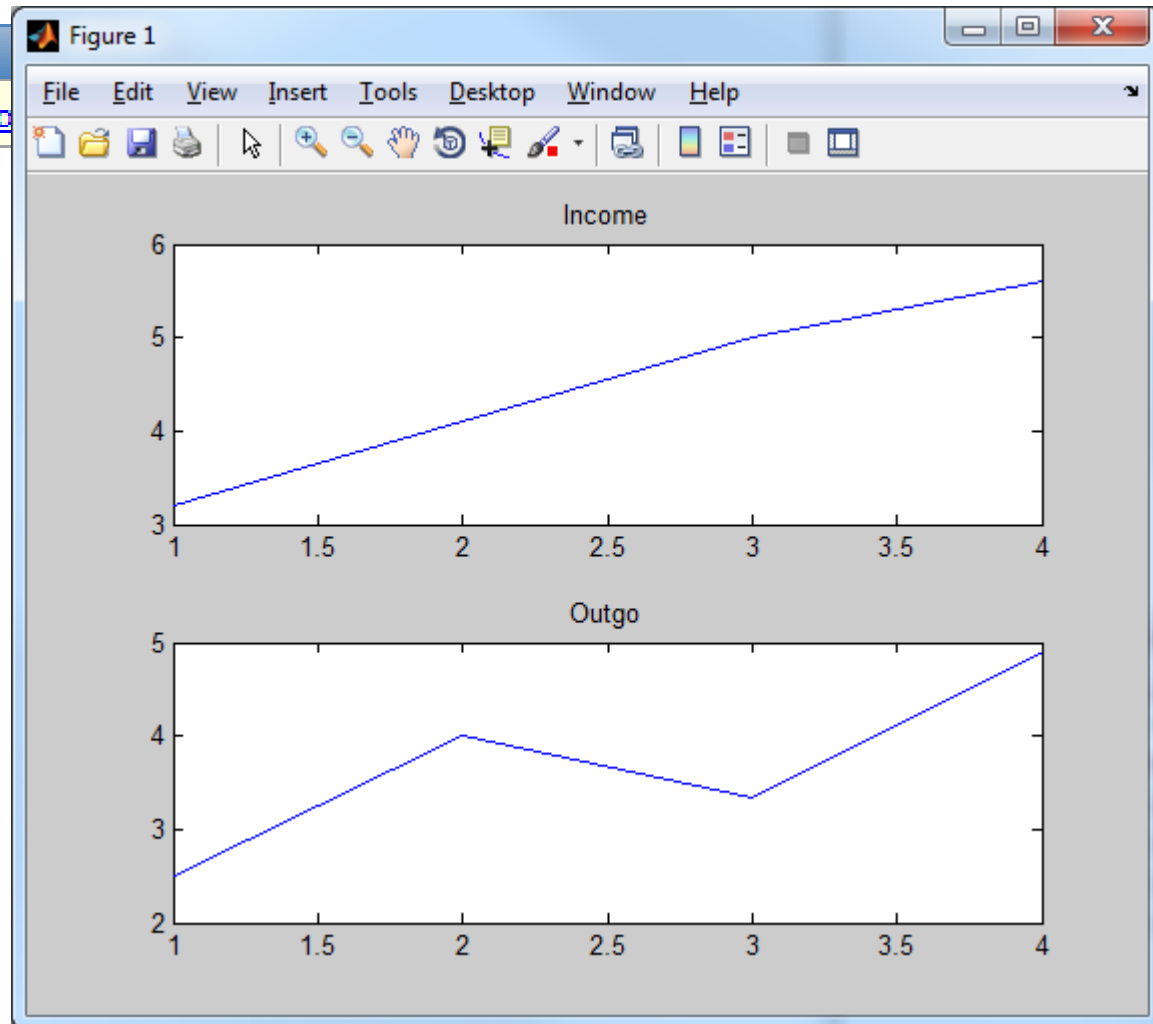


# Plotare - subploturi

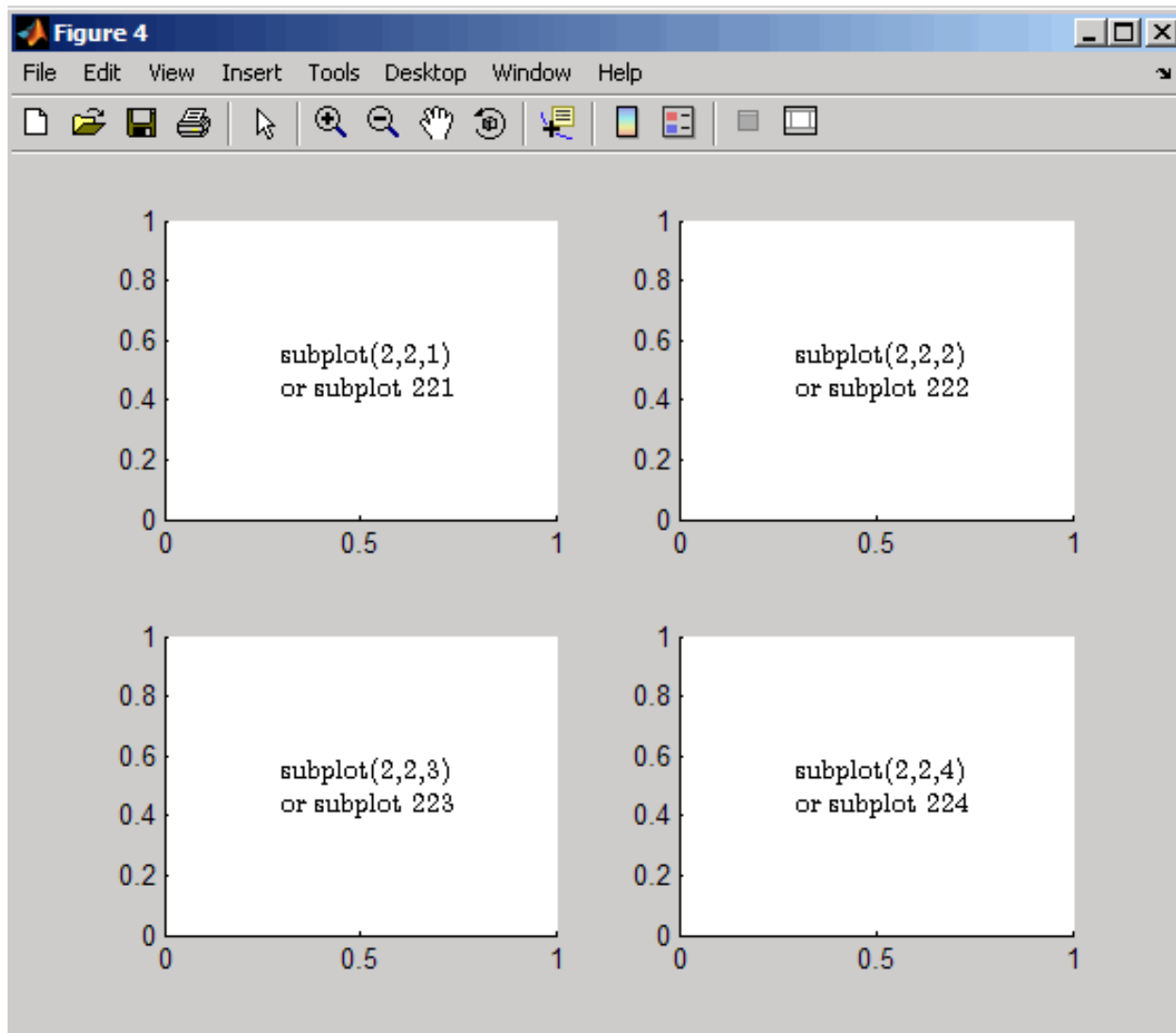
Command Window

 New to MATLAB? Watch this [Video](#), see [Demo](#)

```
>> income = [3.2 4.1 5.0 5.6];  
outgo = [2.5 4.0 3.35 4.9];  
subplot(2,1,1); plot(income)  
title('Income')  
subplot(2,1,2); plot(outgo)  
title('Outgo')  
fx >> |
```



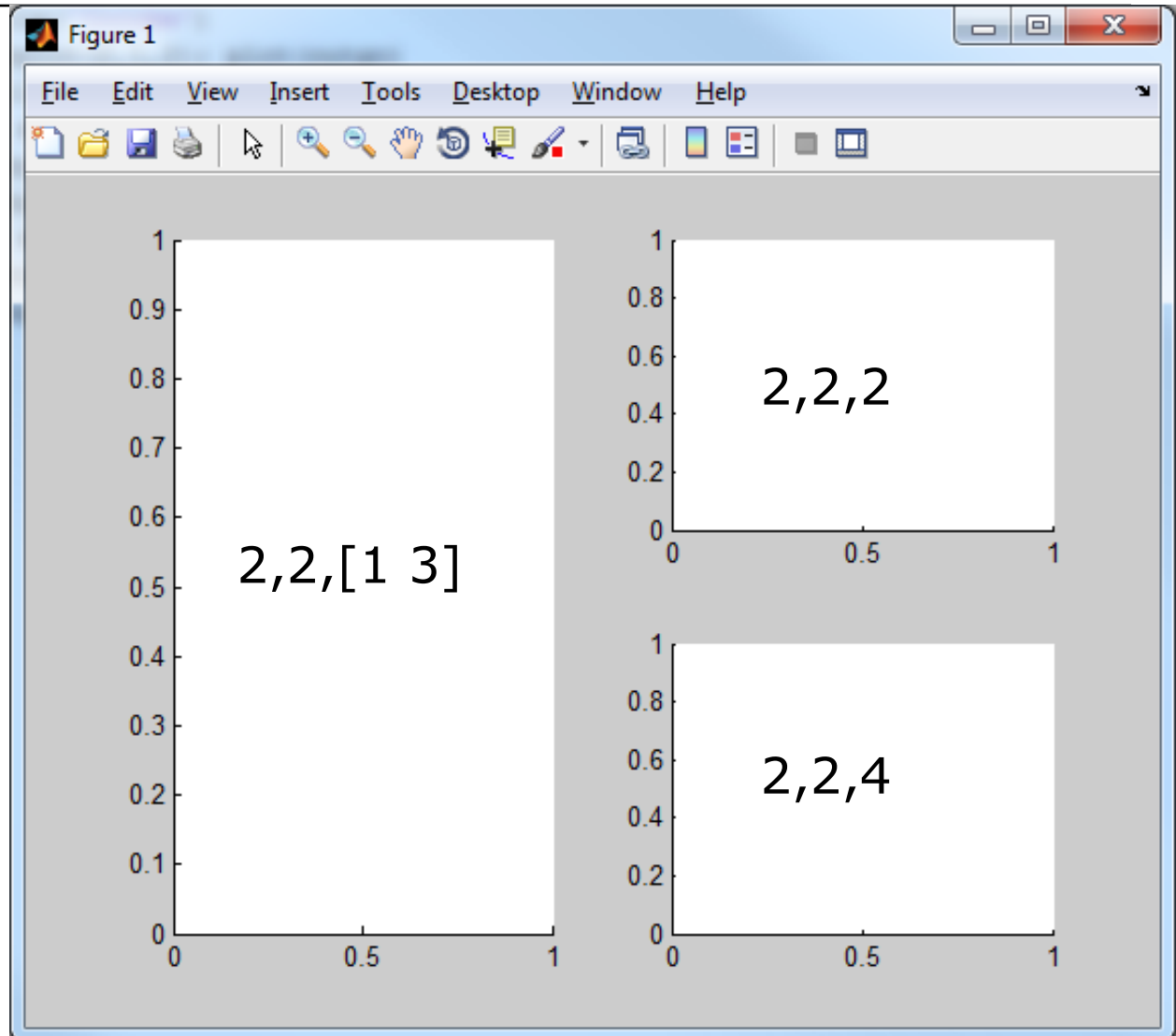
# Plotare - subploturi



# Plotare – subploturi asimetrice

 New to MATLAB? Watch this [Video](#)

```
>> subplot(2,2,[1 3])  
subplot(2,2,2)  
subplot(2,2,4)  
>>
```



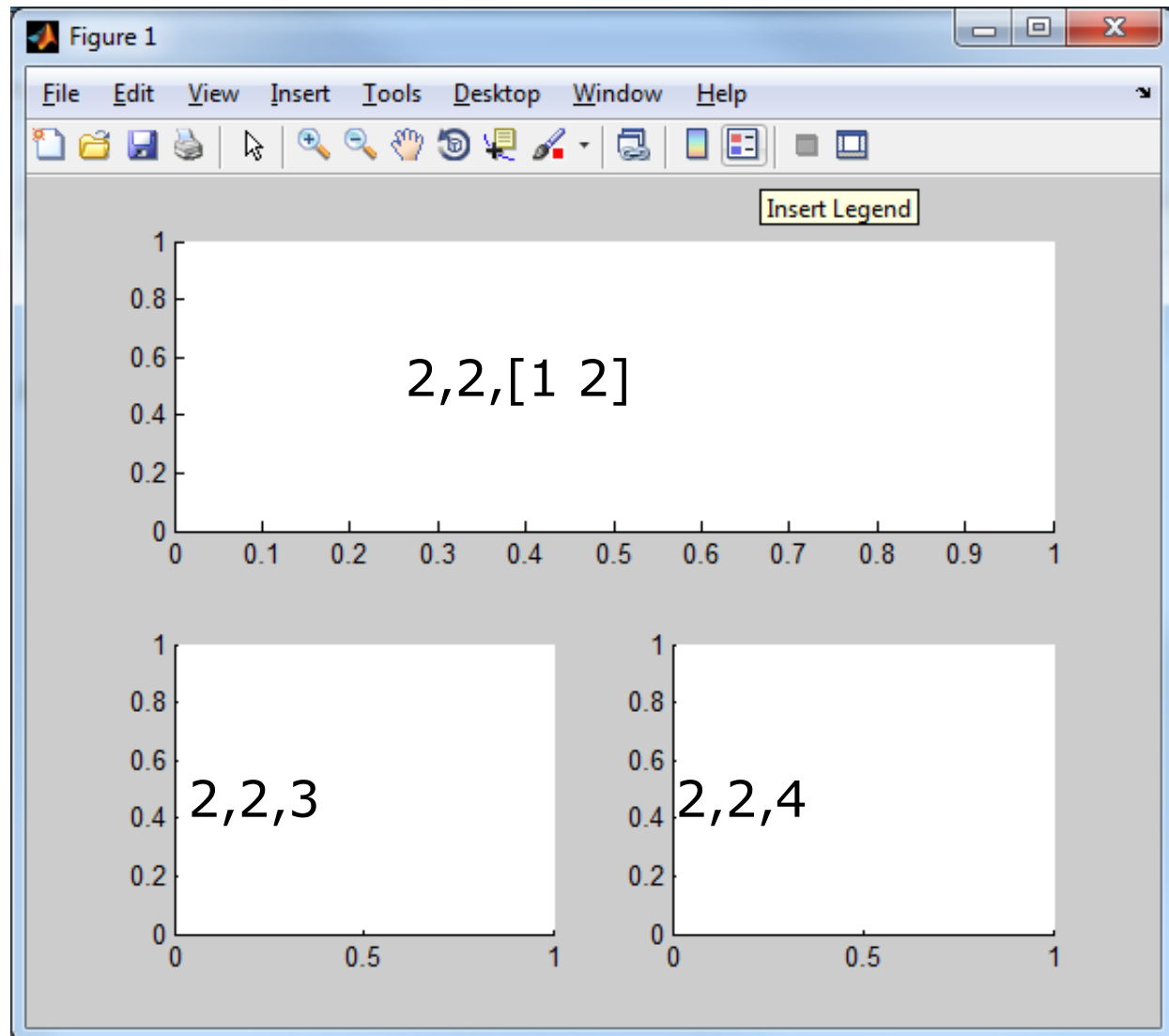


# Plotare – subploturi asimetrice

Command Window

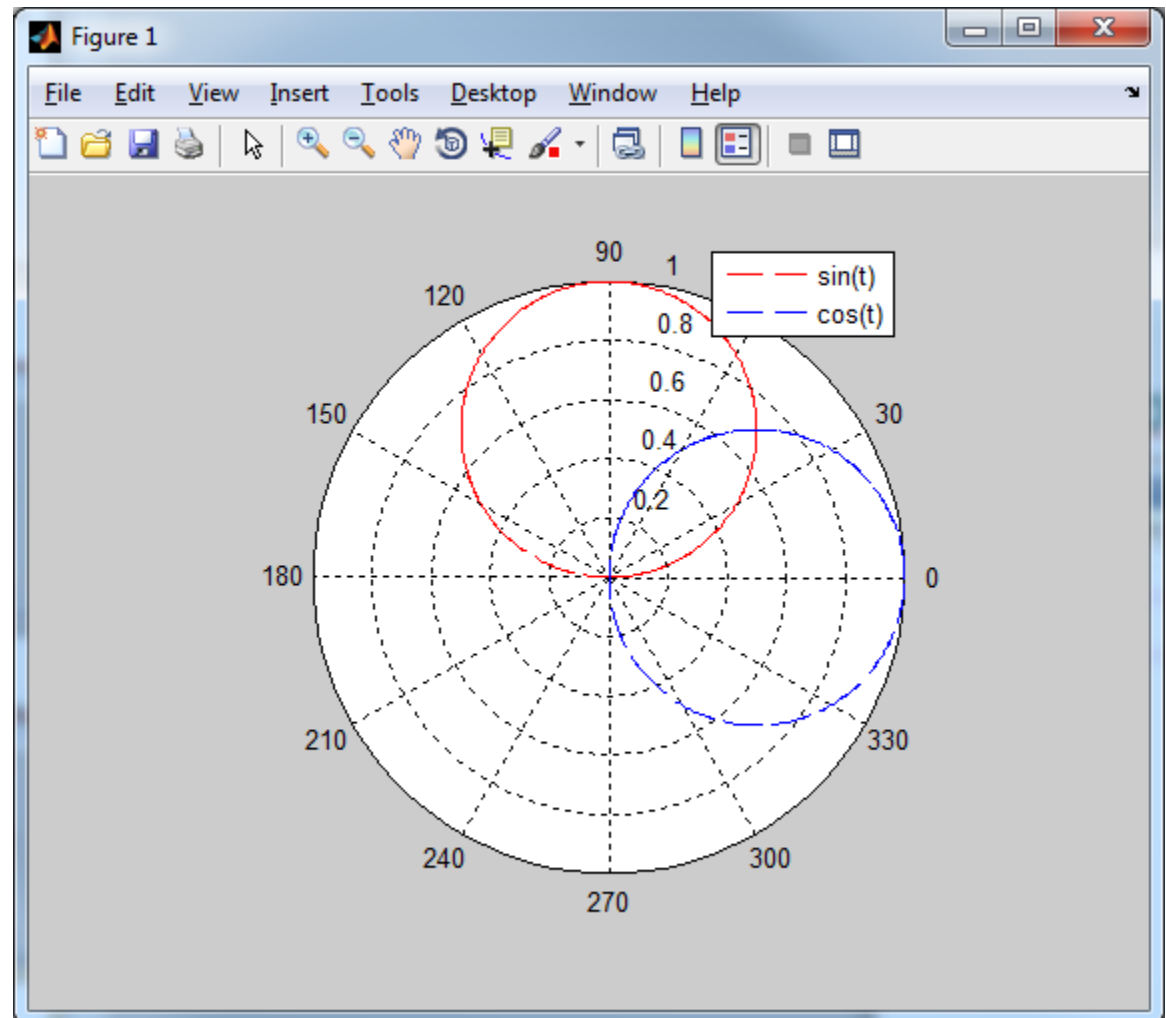
 New to MATLAB? Watch this [Video](#)

```
>> subplot(2,2,1:2)
subplot(2,2,3)
subplot(2,2,4)
fx >>
```




# Plotare –coordonate polare

```
Command Window  
New to MATLAB? Watch this Video, see De  
>> t = 0:.01:2*pi;  
>> polar(t,sin(t),'--r')  
>> hold on  
>> polar(t,cos(t),'--b')  
fx >>
```

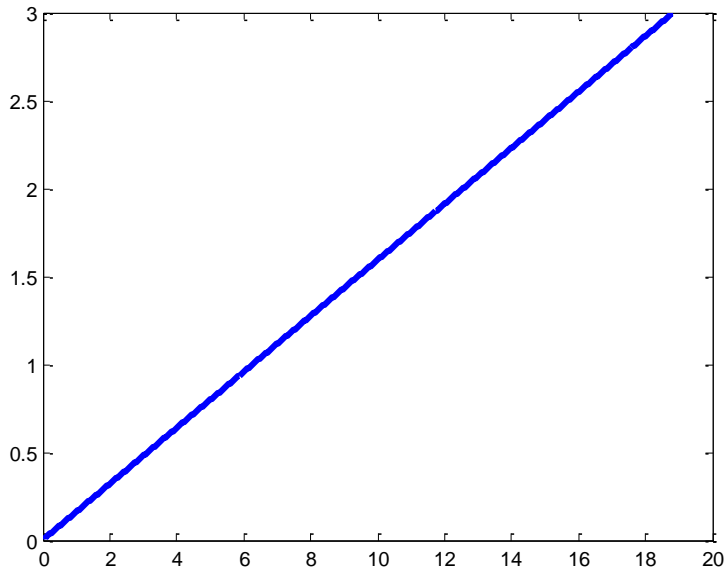


# Plotare – coordonate polare

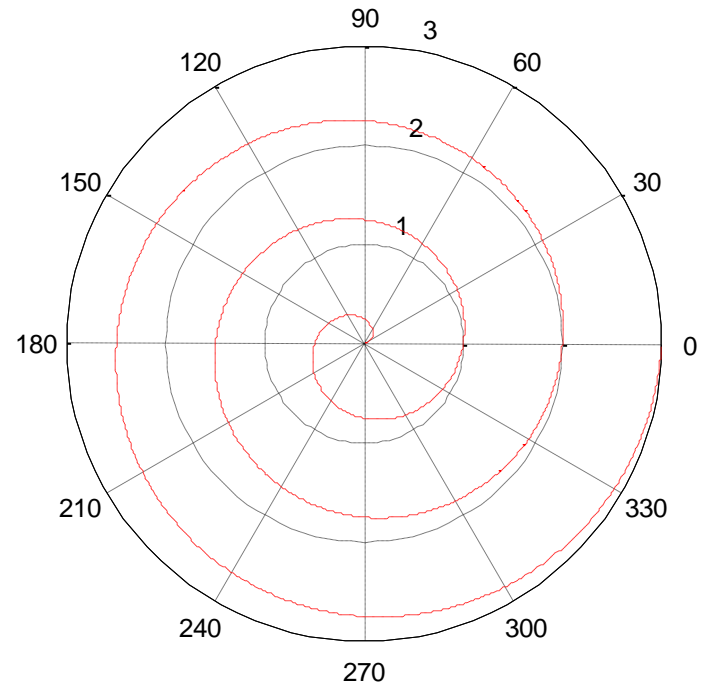
Command Window

 New to MATLAB? Watch this [Video](#), see [Demo!](#)

```
>> x=0:0.01:6*pi;  
>> y=x./(2*pi);  
>> polar(x,y,'--r')  
>> plot(x,y,'b','LineWidth',3)  
>> |
```



Coordonate  
carteziene



Coordonate  
polare

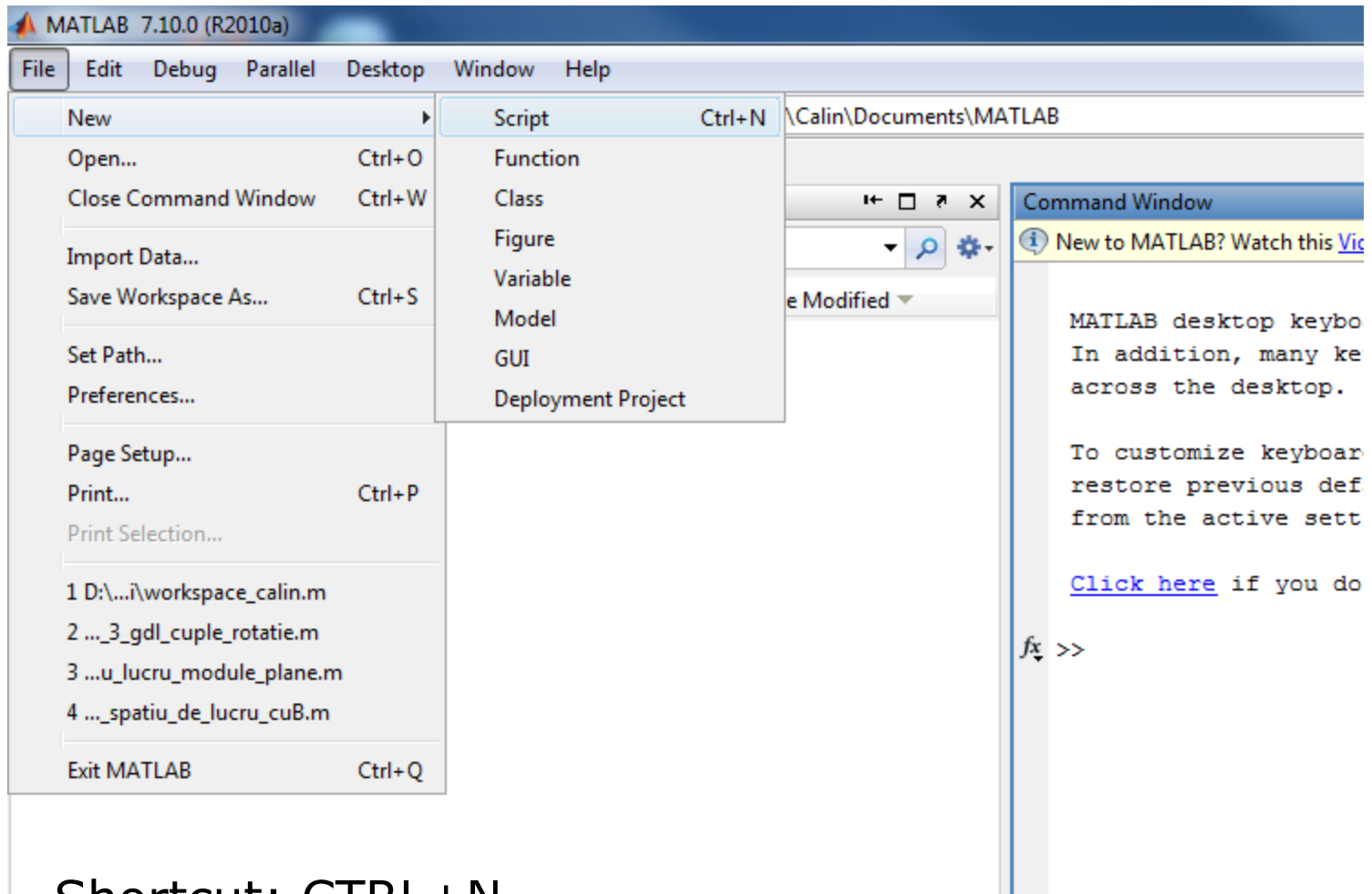


## Fisiere utilizator - scripturi

---

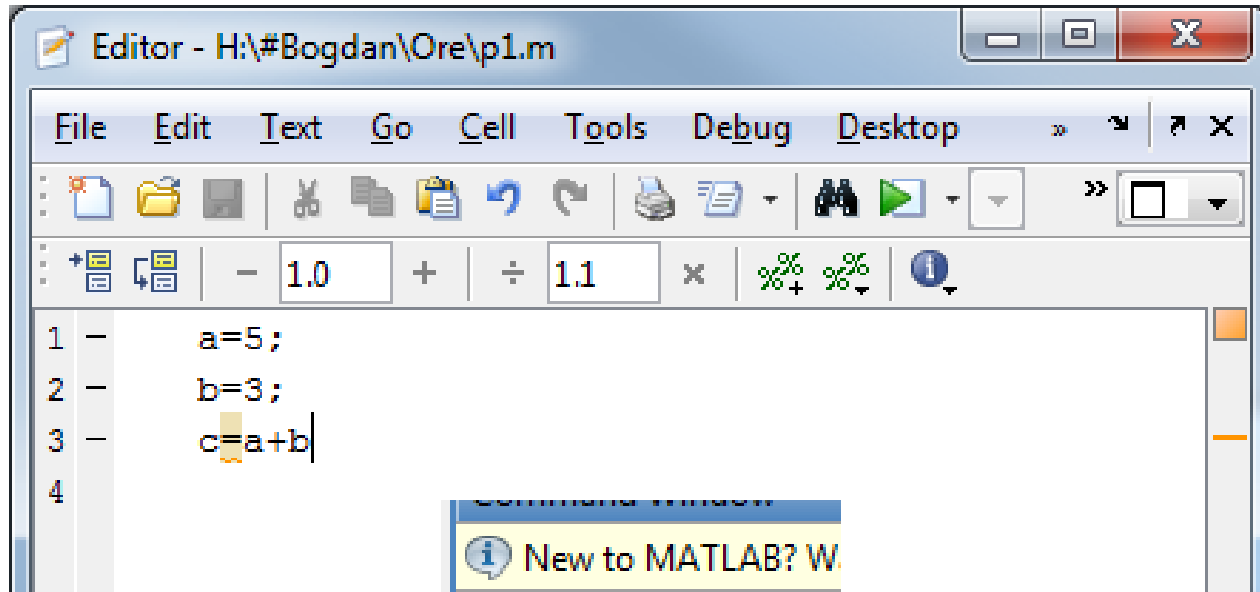
Orice set de operatii poate fi grupat intr-un fisier, numit **script**, care pe baza unor date de intrare determina pe baza unui algoritm un set de date de iesire, care pot fi rezultate numerice, statistice, grafice, etc.

# Crearea unui fisier nou



Shortcut: CTRL+N

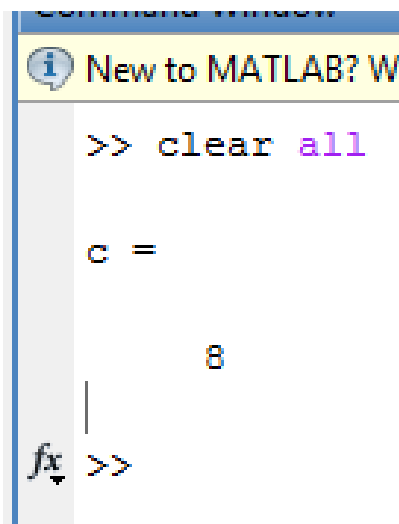
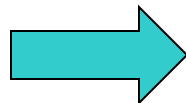
# Script – suma a doua numere



The image shows a MATLAB Editor window titled "Editor - H:\#Bogdan\Ore\p1.m". The menu bar includes File, Edit, Text, Go, Cell, Tools, Debug, and Desktop. The toolbar contains various icons for file operations and execution. Below the toolbar, there are numeric input fields for a constant (1.0) and a variable (1.1), along with mathematical operators. The main editor area contains the following code:

```
1 - a=5;  
2 - b=3;  
3 - c=a+b  
4
```

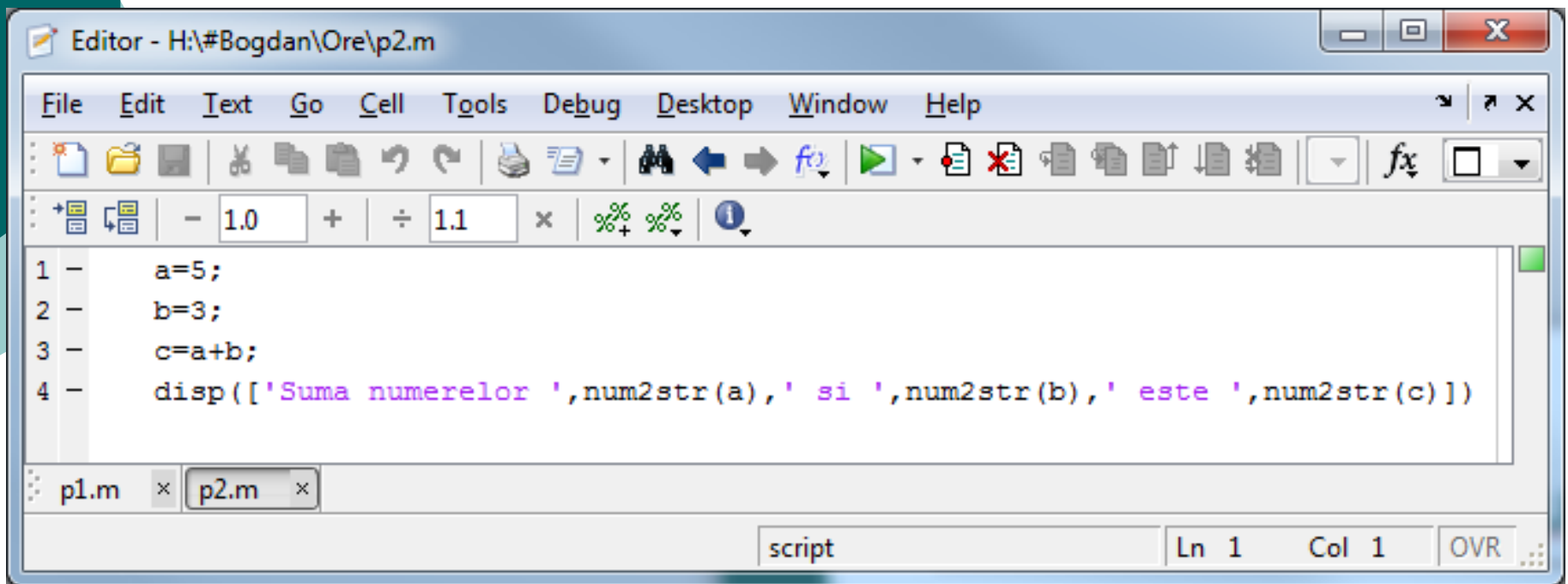
Rezultat



The image shows a MATLAB Command Window with the following output:

```
>> clear all  
  
c =  
  
      8  
|  
fx >>
```

# Script – suma a doua numere V2

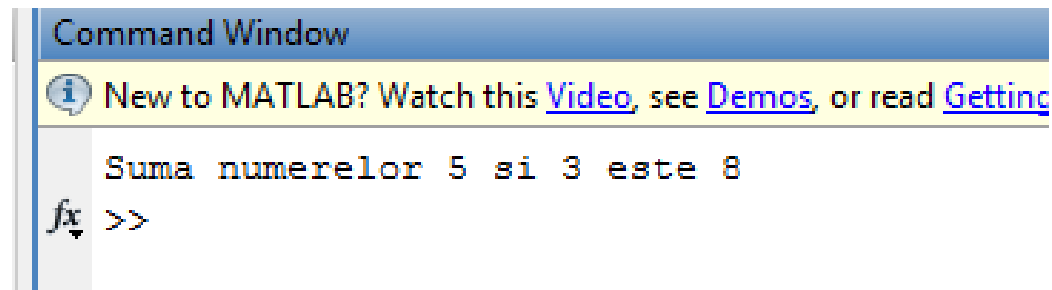
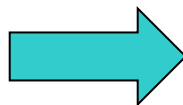


The screenshot shows a MATLAB script editor window titled "Editor - H:\#Bogdan\Ore\p2.m". The menu bar includes File, Edit, Text, Go, Cell, Tools, Debug, Desktop, Window, and Help. The toolbar contains various icons for file operations and execution. Below the toolbar is a numeric keypad with values 1.0, 1.1, and a percentage sign. The main text area contains the following MATLAB code:

```
1 - a=5;  
2 - b=3;  
3 - c=a+b;  
4 - disp(['Suma numerelor ', num2str(a), ' si ', num2str(b), ' este ', num2str(c)])
```

The status bar at the bottom shows "script", "Ln 1", "Col 1", and "OVR".

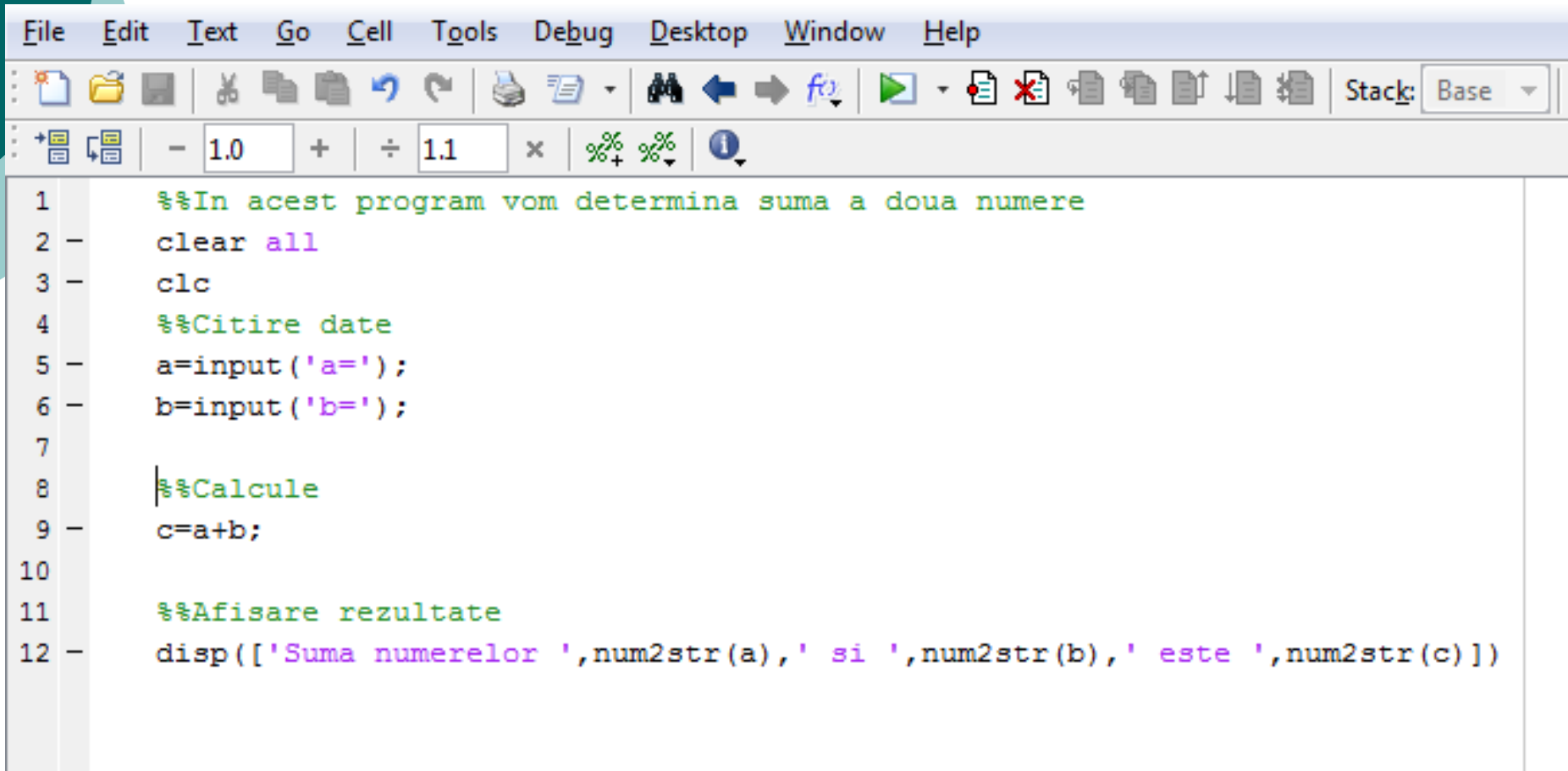
Rezultat



The screenshot shows the MATLAB Command Window. At the top, it says "Command Window". Below that, there is a message: "New to MATLAB? Watch this [Video](#), see [Demos](#), or read [Getting](#)". The output of the script is displayed as:

```
Suma numerelor 5 si 3 este 8  
fx >>
```

# Script – suma a doua numere V3



The image shows a screenshot of the MATLAB script editor. The window title is "MATLAB: Untitled (Script)". The menu bar includes File, Edit, Text, Go, Cell, Tools, Debug, Desktop, Window, and Help. The toolbar contains various icons for file operations, editing, and execution. The command window at the bottom shows the current values of variables: a = 1.0, b = 1.1, and c = 2.1. The script code is as follows:

```
1 %%In acest program vom determina suma a doua numere
2 - clear all
3 - clc
4 %%Citire date
5 - a=input('a=');
6 - b=input('b=');
7
8 %%Calculule
9 - c=a+b;
10
11 %%Afisare rezultate
12 - disp(['Suma numerelor ',num2str(a),' si ',num2str(b),' este ',num2str(c)])
```



# Script – suma a doua numere V3

```
Command Window  
  
New to MATLAB? Watch this Video, see Demos, or read Getting Started.  
  
a=3.456  
b=pi*4  
Suma numerelor 3.456 si 12.5664 este 16.0224  
fx >> |
```

