

Procesamiento y Análisis de Series de Tiempo en Matlab

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Variables

- $X = 9$: Estamos guardando en la memoria (RAM, random access memory) el valor 9, el lugar de la memoria llamado x.
- Ya que el valor de x puede cambiar, se llama variable x.
- Consisten en solo letras de la a-z, dígitos 0-9 y underscore(_).
- Deben comenzar con una letra
- Ejemplo: r2d2, temp_E1; t90, etc.
- Mayúsculas y minúsculas son diferentes

R2D2 no es igual a r2d2

- Si se trata de hacer referencia a una variable no definida:

??? Undefined function or variable

```
Command Window
>> f
Undefined function or variable 'f'.

>> l
Undefined function or variable 'l'.

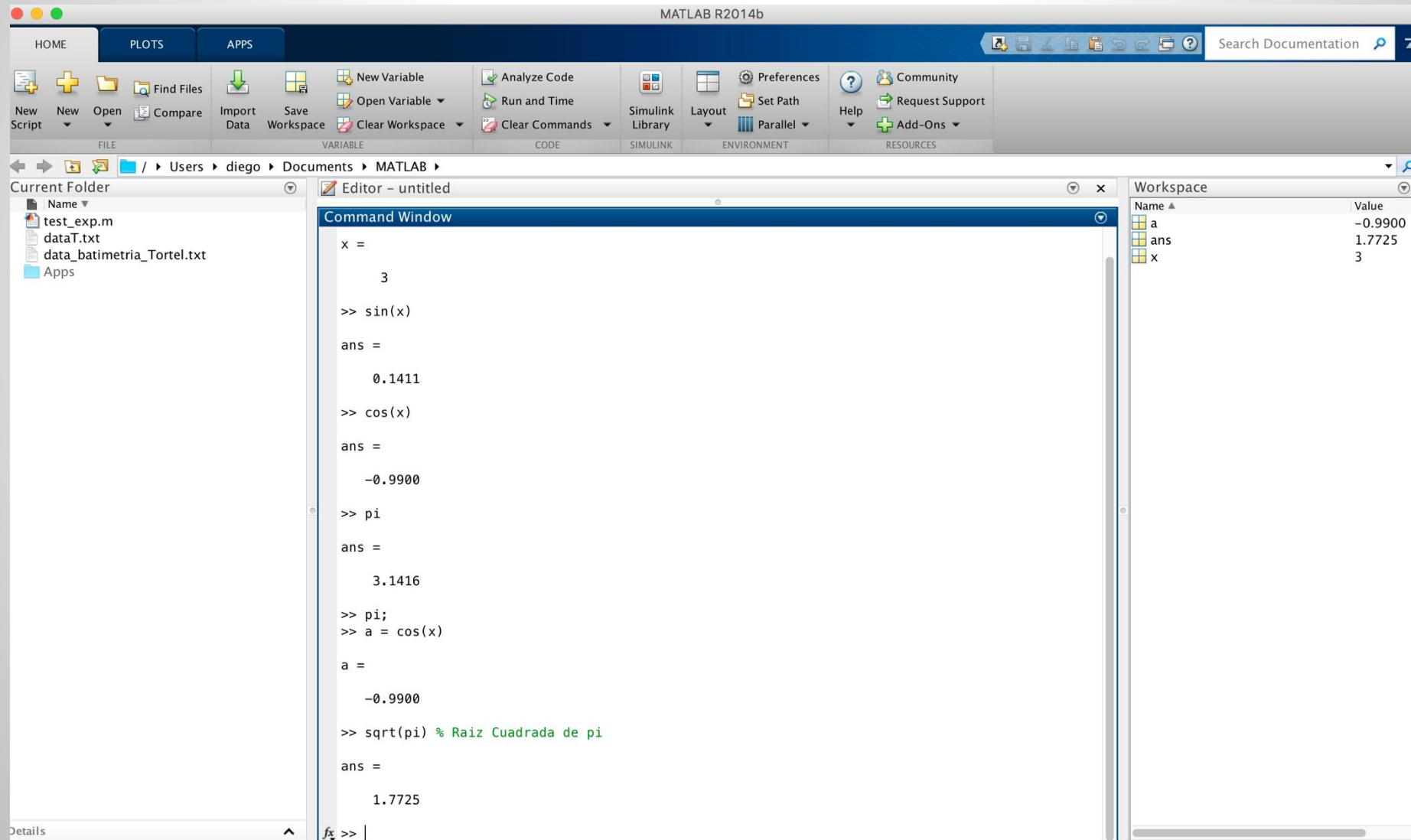
>> a

a =

-0.9900

fx >> |
```

Funciones intrinsicas



Arrays (arreglos): Vectores y Matrices

- MATLAB = MATrix LABoratory, es decir, diseñado para trabajar con matrices
- Matriz es un objeto rectangular (ej. tabla) y consiste de filas (i) y columnas (j). (2D)
- Vector es una matriz con una sola fila o columna. Es una lista de números. (1D)

Vectores

The image shows the MATLAB R2014b interface. The Command Window displays the following commands and their outputs:

```
>> clear all
>> x = [1 3 0 -1 5]

x =

     1     3     0    -1     5

>> disp(x)
     1     3     0    -1     5

>> whos
  Name      Size      Bytes   Class    Attributes

  x         1x5         40   double

>> a = [5,6,7]

a =

     5     6     7

>> x = [130-15] % No olvidar poner los espacios

x =

    115

>> a = [1 2 3];
>> b = [4 5];
>> c = [1 -b]
```

The Workspace window on the right shows the following variables:

Name	Value
a	[1,2,3]
b	[4,5]
x	115

Vectores

Editor - untitled

Command Window

```
>> x = 1:10
```

```
x =
```

```
     1     2     3     4     5     6     7     8     9    10
```

```
>> x = 1:0.5:4
```

```
x =
```

```
    1.0000    1.5000    2.0000    2.5000    3.0000    3.5000    4.0000
```

```
>> x = 10:-1:1
```

```
x =
```

```
    10     9     8     7     6     5     4     3     2     1
```

```
>> x = 1:2:6
```

```
x =
```

```
     1     3     5
```

```
>> x = 0:-2:-5
```

```
x =
```

```
     0    -2    -4
```

fx >>

Subíndices en Vectores (subscript)

Command Window

```
>> v = [1 4 6 7 8]
```

```
v =
```

```
    1    4    6    7    8
```

```
>> v(3) % subíndice = 3
```

```
ans =
```

```
    6
```

```
>> v(1:2) % subíndice del 1 al 2
```

```
ans =
```

```
    1    4
```

```
>> v([4 2]) % subíndice 4 y 2
```

```
ans =
```

```
    7    4
```

```
fx >> |
```

- Un subíndice se indica dentro de paréntesis redondo
- Puede ser un escalar o vector
- Siempre empieza de 1
- Subíndices fraccionales se redondean hacia abajo $v(1.9) = v(1)$

Matrices

Command Window

```
>> a = [1 2 3; 4 5 6]
```

```
a =
```

```
    1    2    3  
    4    5    6
```

```
>> a = [1 2 3; 4 5 6]' % Transpuesta
```

```
a =
```

```
    1    4  
    2    5  
    3    6
```

```
>> a' % Transpuesta
```

```
ans =
```

```
    1    2    3  
    4    5    6
```

```
>> b = [ 1 4 6 ...  
3 6 9 ...  
3 4 7]
```

```
b =
```

```
    1    4    6    3    6    9    3    4    7
```

```
>> b = [ 1 4 6 ; 3 6 9; 3 4 7]
```


Subíndices en Matrices

- $b(i,j)$ i = filas; j =columnas
- $b(:,1)$ todas las filas de la columna 1

Command Window

b =

1	4	6
3	6	9
3	4	7

>> b(1,1)

ans =

1

>> b(:,1)

ans =

1
3
3

>> b(1,:)

ans =

1 4 6

>> b(3,2)

ans =

4

Creación de un programa (scripts)

The image shows the MATLAB R2014b interface. The main window is the Editor, displaying a script named `miprimerprograma.m` located at `/Users/diego/miprimerprograma.m`. The script contains the following code:

```
1  
2 -   a = 5; b = 7;  
3  
4 -   c = a + b;  
5  
6 -   d = c + sin(b);  
7  
8 -   e = 5 * d;  
9  
10 -  f = exp(-d);
```

The Command Window shows the execution of the script:

```
>> cd /Users/diego/  
>> miprimerprograma  
>> f  
  
f =  
  
    3.1852e-06  
  
>> a  
  
a =  
  
    5
```

The Workspace window displays the variables created during execution:

Name	Value
a	5
ans	0
b	7
c	12
d	12.6570
e	63.2849
f	3.1852e-06

Help (Ayuda)

The image shows the MATLAB R2014b desktop environment. The top toolbar includes tabs for HOME, PLOTS, and APPS. Below the toolbar is a menu bar with options like New Script, Open, Find Files, Import Data, Save Workspace, New Variable, Open Variable, Clear Workspace, Analyze Code, Run and Time, Clear Commands, Simulink Library, Layout, Preferences, Set Path, Parallel, Help, Community, Request Support, and Add-Ons. The main workspace is divided into three panes: Current Folder, Editor - untitled, and Workspace.

Current Folder: Shows a list of files and folders: test_exp.m, dataT.txt, data_batimetria_Tortel.txt, and Apps.

Editor - untitled: Displays the Command Window with the following content:

```
>> help sin
sin    Sine of argument in radians.
      sin(X) is the sine of the elements of X.

See also asin, sind.

Overloaded methods:
codistributed/sin
gpuArray/sin
sym/sin

Reference page in Help browser
doc sin

>> help pi
pi     3.1415926535897....
      pi = 4*atan(1) = imag(log(-1)) = 3.1415926535897....

Reference page in Help browser
doc pi

>> help plot
plot   Linear plot.
      plot(X,Y) plots vector Y versus vector X. If X or Y is a matrix,
      then the vector is plotted versus the rows or columns of the matrix,
      whichever line up. If X is a scalar and Y is a vector, disconnected
      line objects are created and plotted as discrete points vertically at
      X.

      plot(Y) plots the columns of Y versus their index.
      If Y is complex, plot(Y) is equivalent to plot(real(Y),imag(Y)).
      In all other uses of plot, the imaginary part is ignored.

      Various line types, plot symbols and colors may be obtained with
```

Workspace: Shows a table of variables in the workspace:

Name	Value
a	-0.9900
ans	1.7725
x	3