

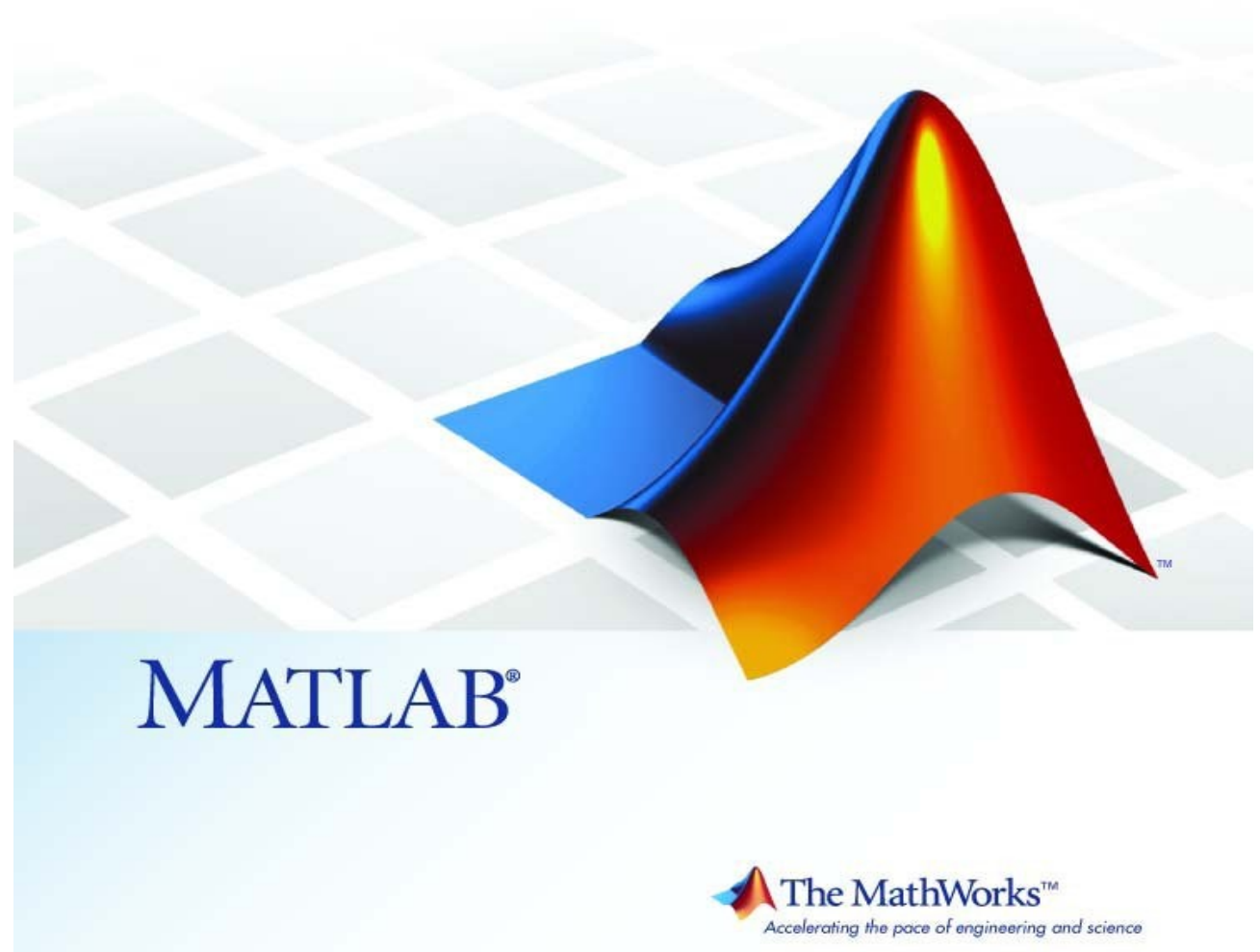
Introdução ao MATLAB

Métodos Numéricos

Prof. Fernando Passold

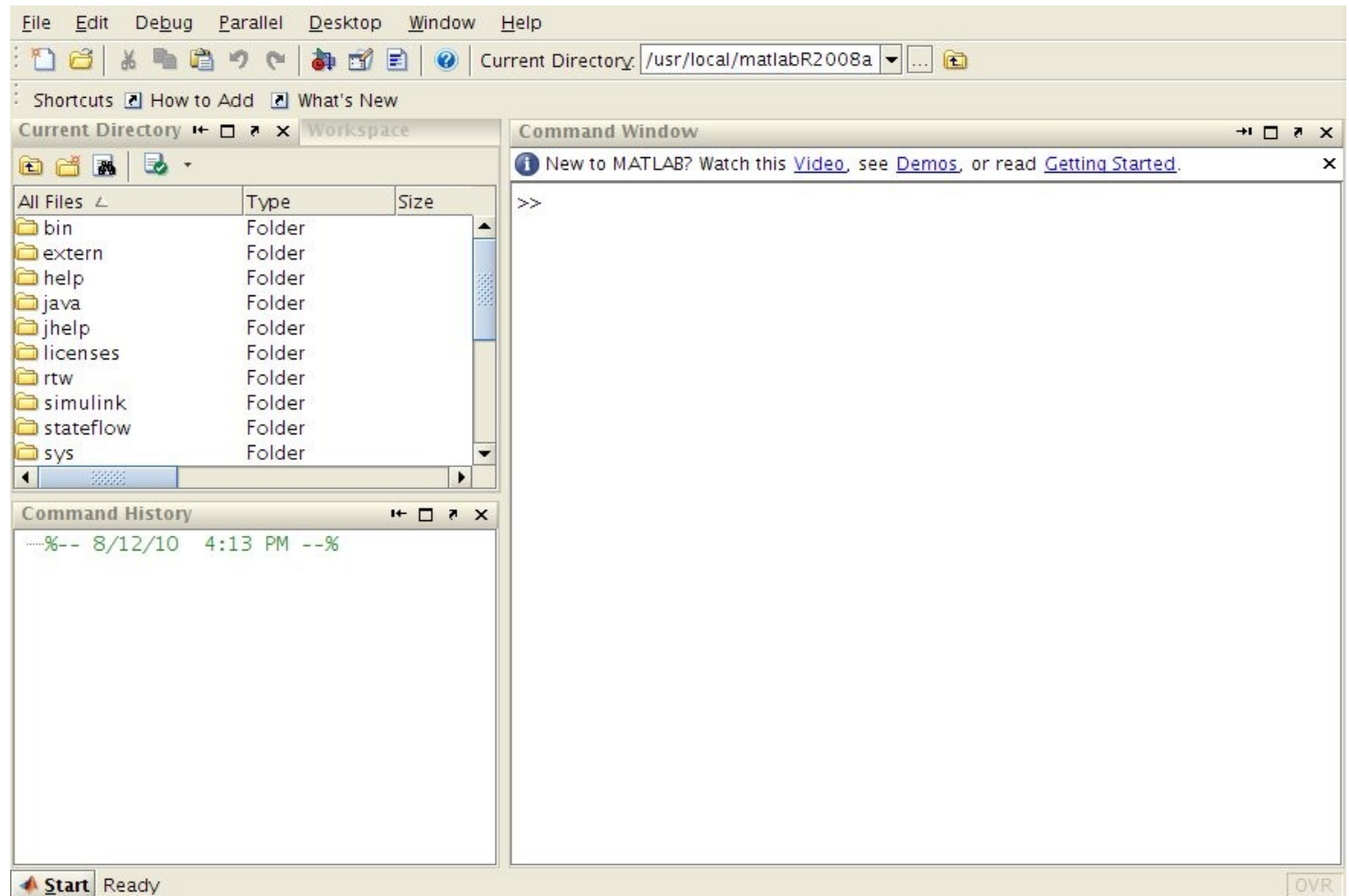
2010

Início

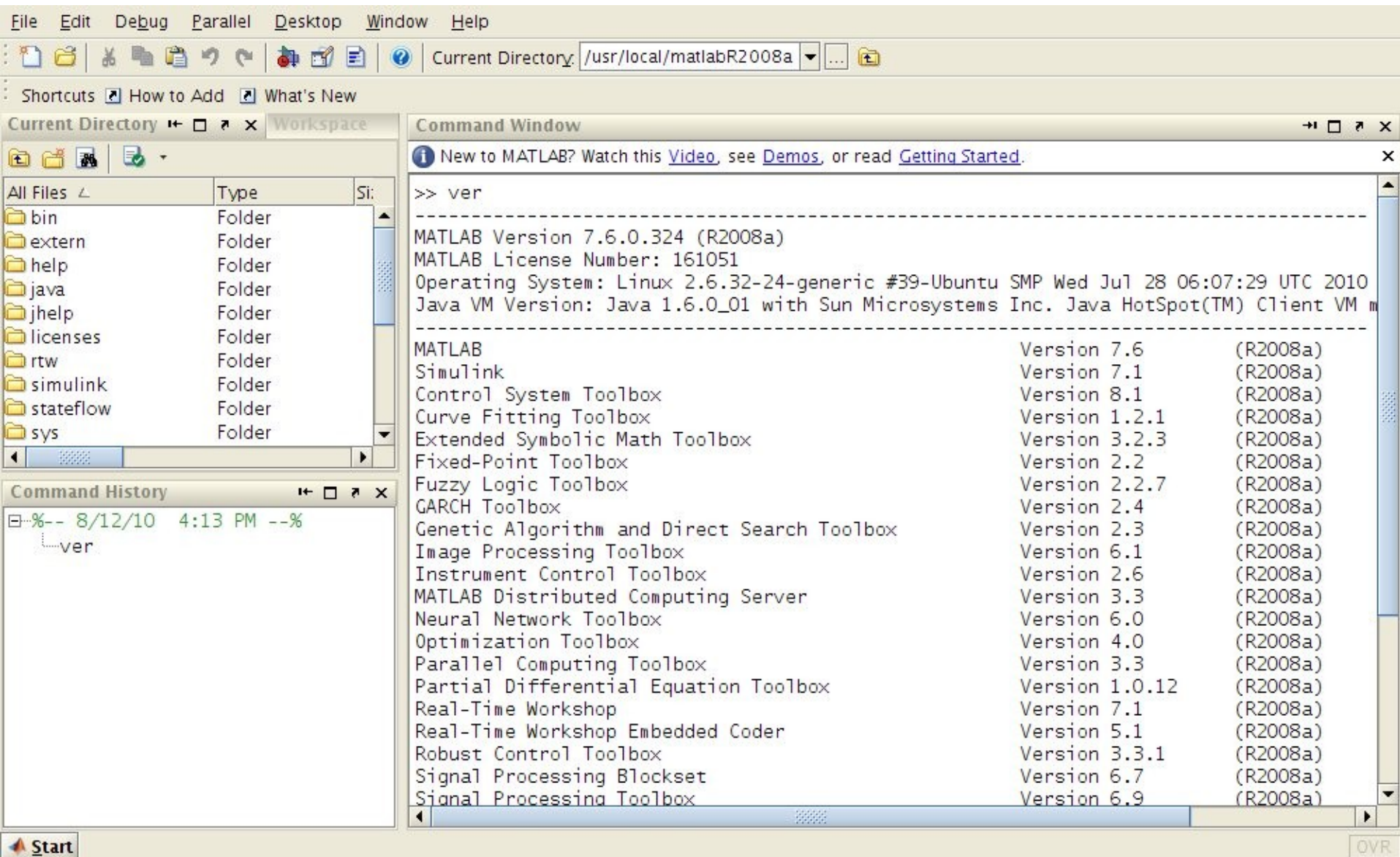


www.mathworks.com Web
comp.soft-sys.matlab Newsgroup
www.mathworks.com/contact_TS.html Technical Support

Tela inicial do MATLAB



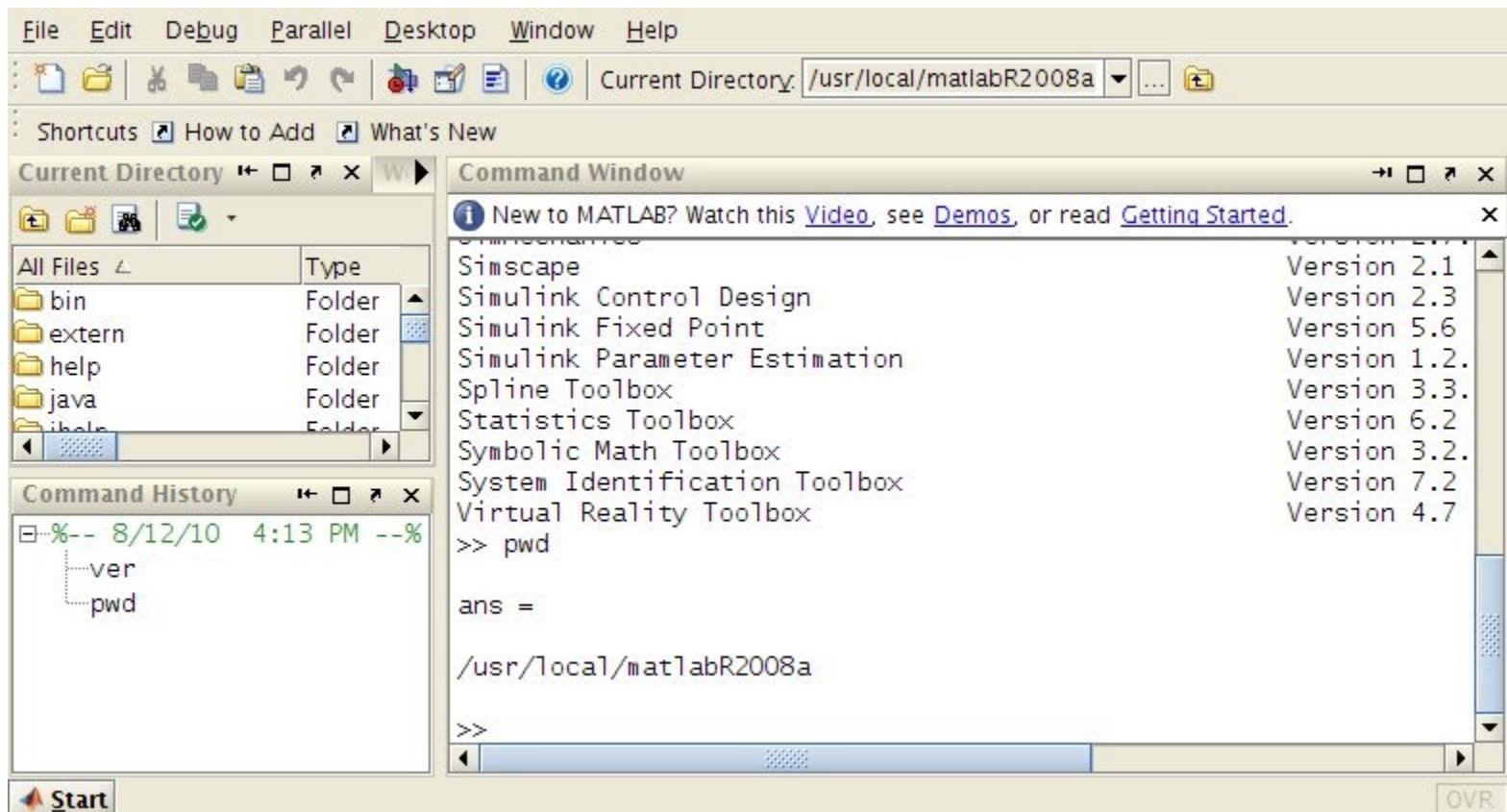
Outras telas do MATLAB:



Comandos iniciais:

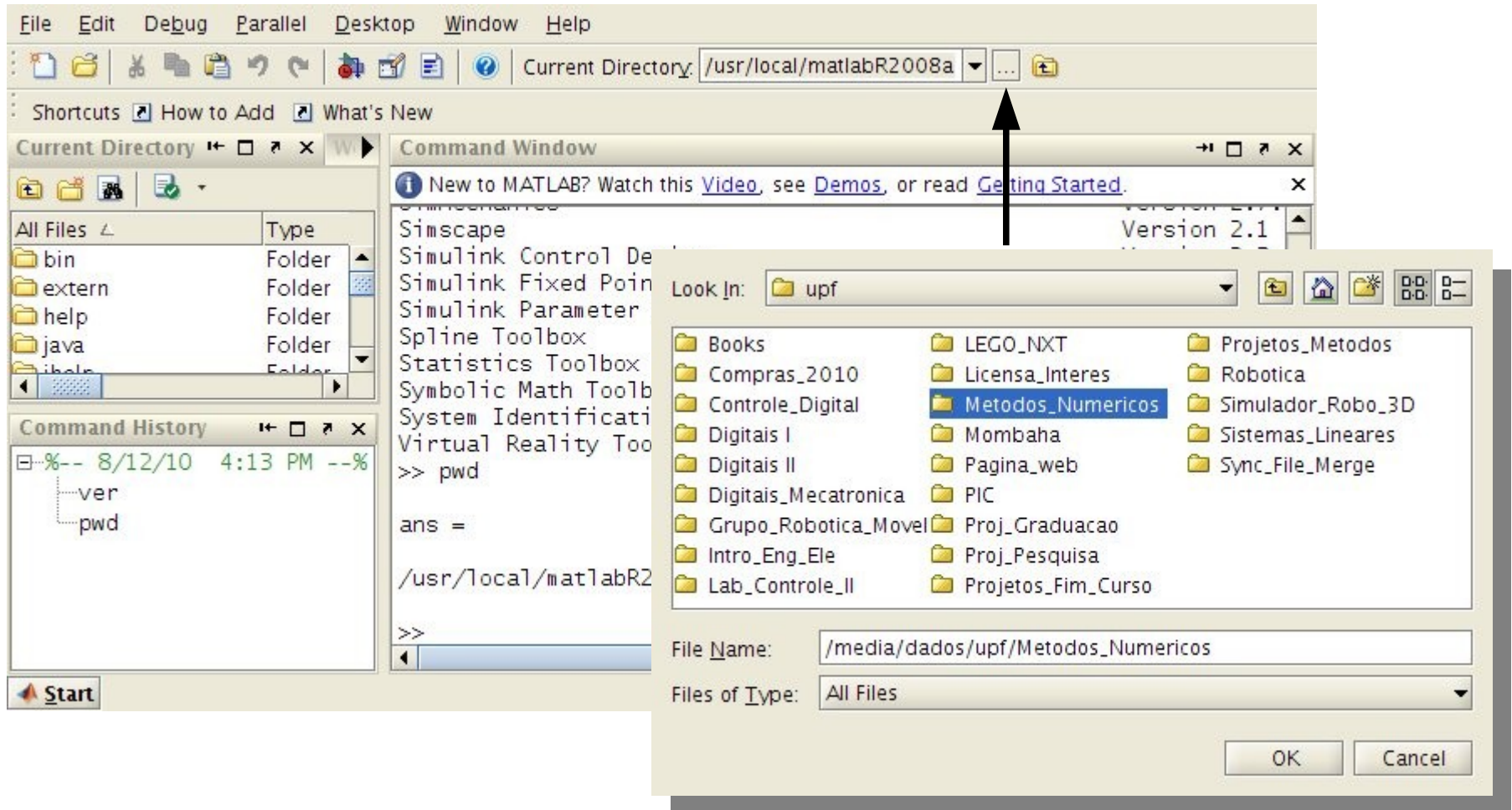
Verificar diretório atual de trabalho:

>> pwd



Ajustar diretório de trabalho:

>> **cd** /media/dados/upf/Metodos_Numericos



Comandos de uso do MATLAB:

Comprovando diretório atual de trabalho:

```
>> pwd
```

```
ans =
```

```
C:\Users\fpassold\Documents\MATLAB
```

```
>>
```

Exibir (todos) os arquivos do diretório atual de trabalho:

```
>> ls
```

```
.                ..                Thumbs.db                exemplo_fplot1.jpg
```

```
>> dir
```

```
.                ..                Thumbs.db                exemplo_fplot1.jpg
```

```
>>
```

Comandos de uso do MATLAB:

Mudança de diretório de trabalho:

```
>> cd d:\upf\Metodos_Numericos\
```

```
>>
```

Comprovando diretório atual de trabalho:

```
>> pwd
```

```
ans =
```

```
d:\upf\Metodos_Numericos
```

```
>>
```

Exibir arquivos de trabalho do Matlab no diretório atual:

```
>> what
```

M-files in the current directory d:\upf\Metodos_Numericos

```
gauss_seidel      gsmf              jacob1
```

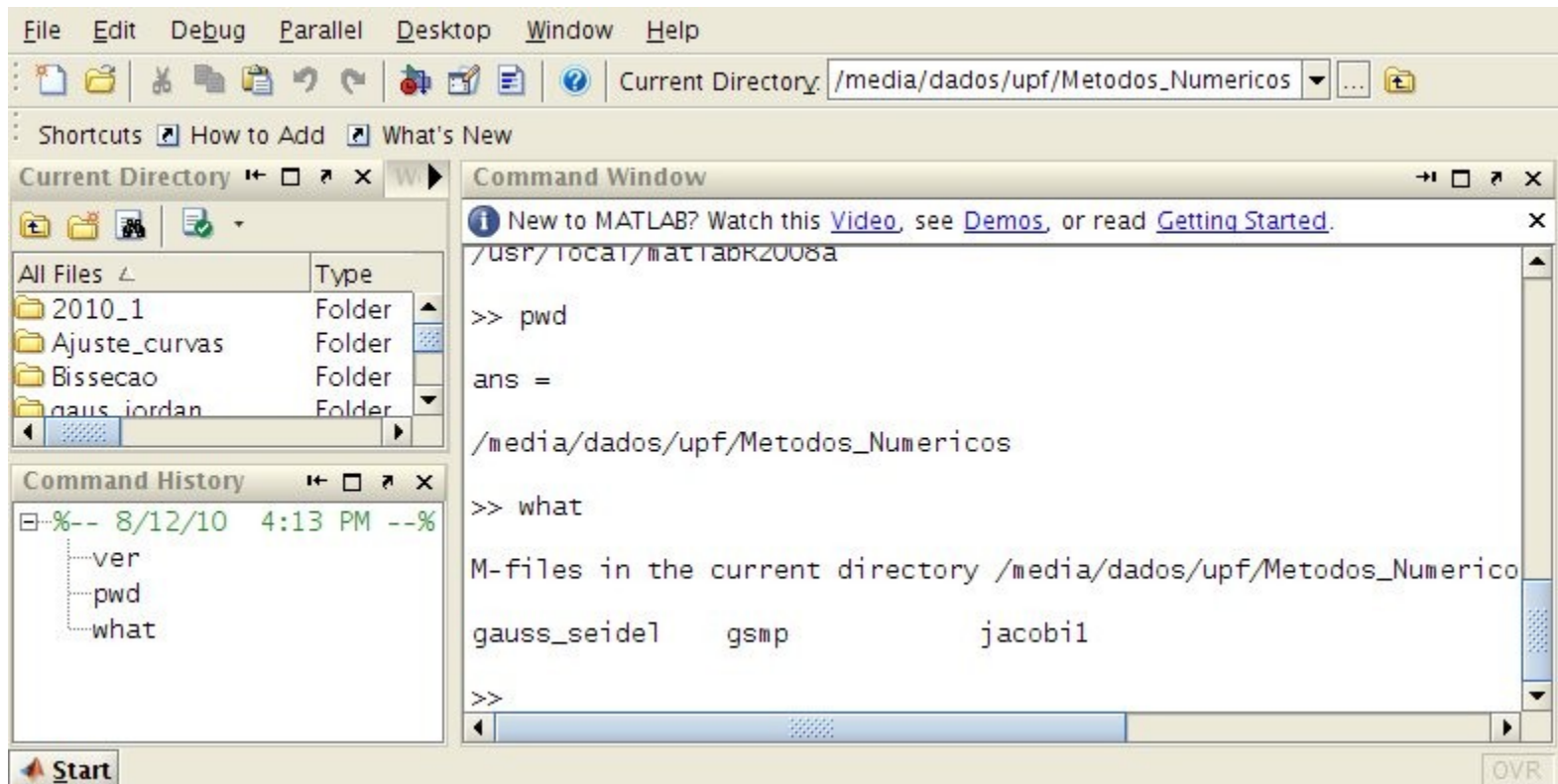
```
>>
```



Comandos de uso do MATLAB:

Exibir arquivos de trabalho do Matlab no diretório atual:

>> what



Tipos de Arquivos (MATLAB):

Arquivos: código de programação em linguagem C:



Arquivos usados pelo MATLAB:



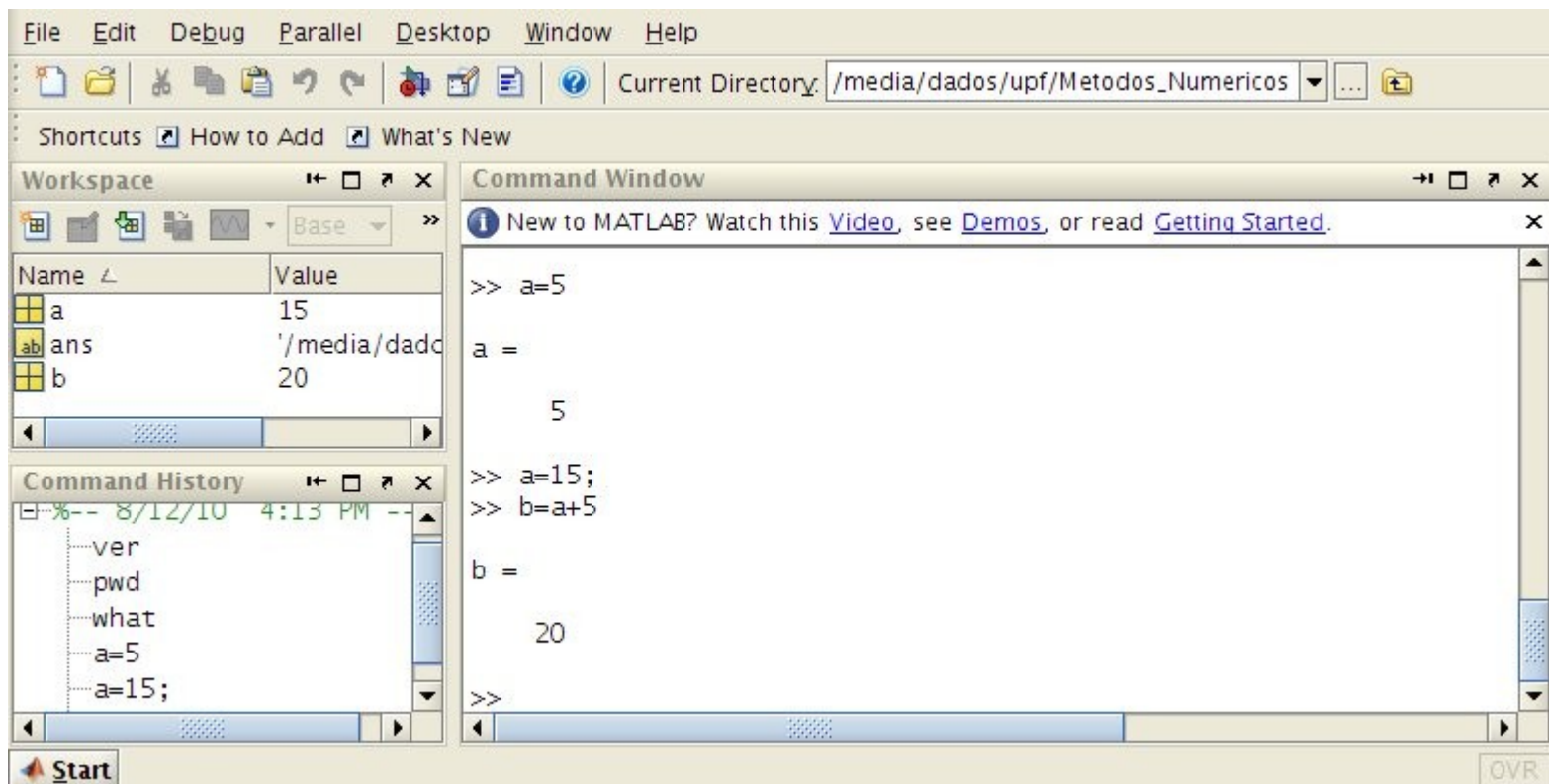
Funções programas
na linguagem de
programação do
MATLAB (arquivo
texto)



Dados, tabelas de
dados usados pelo
MATLAB (arquivo
texto)

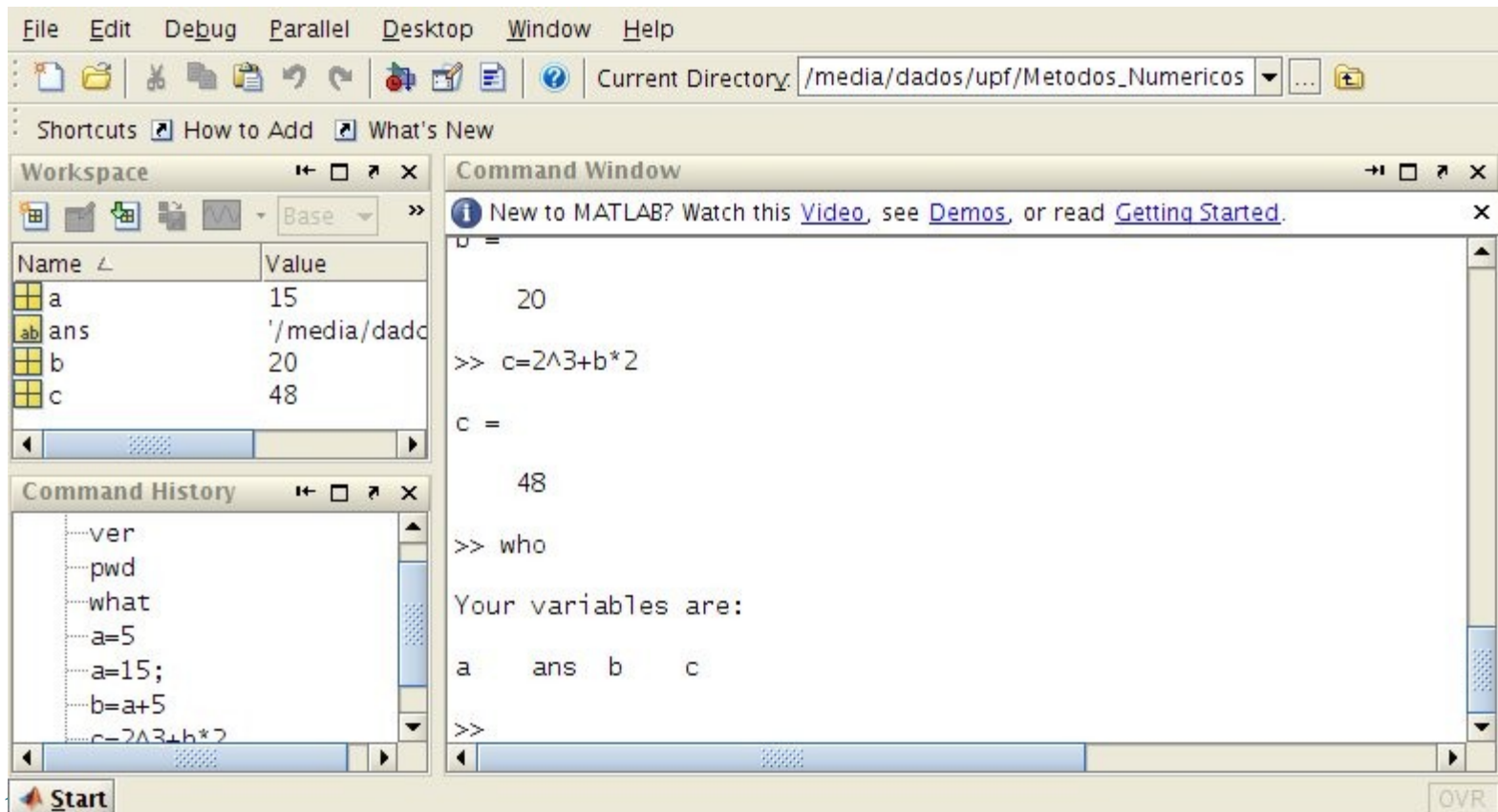
Começando a usar o MATLAB:

- Criando variáveis:
- Verificando variáveis criadas:



Comandos de uso do MATLAB:

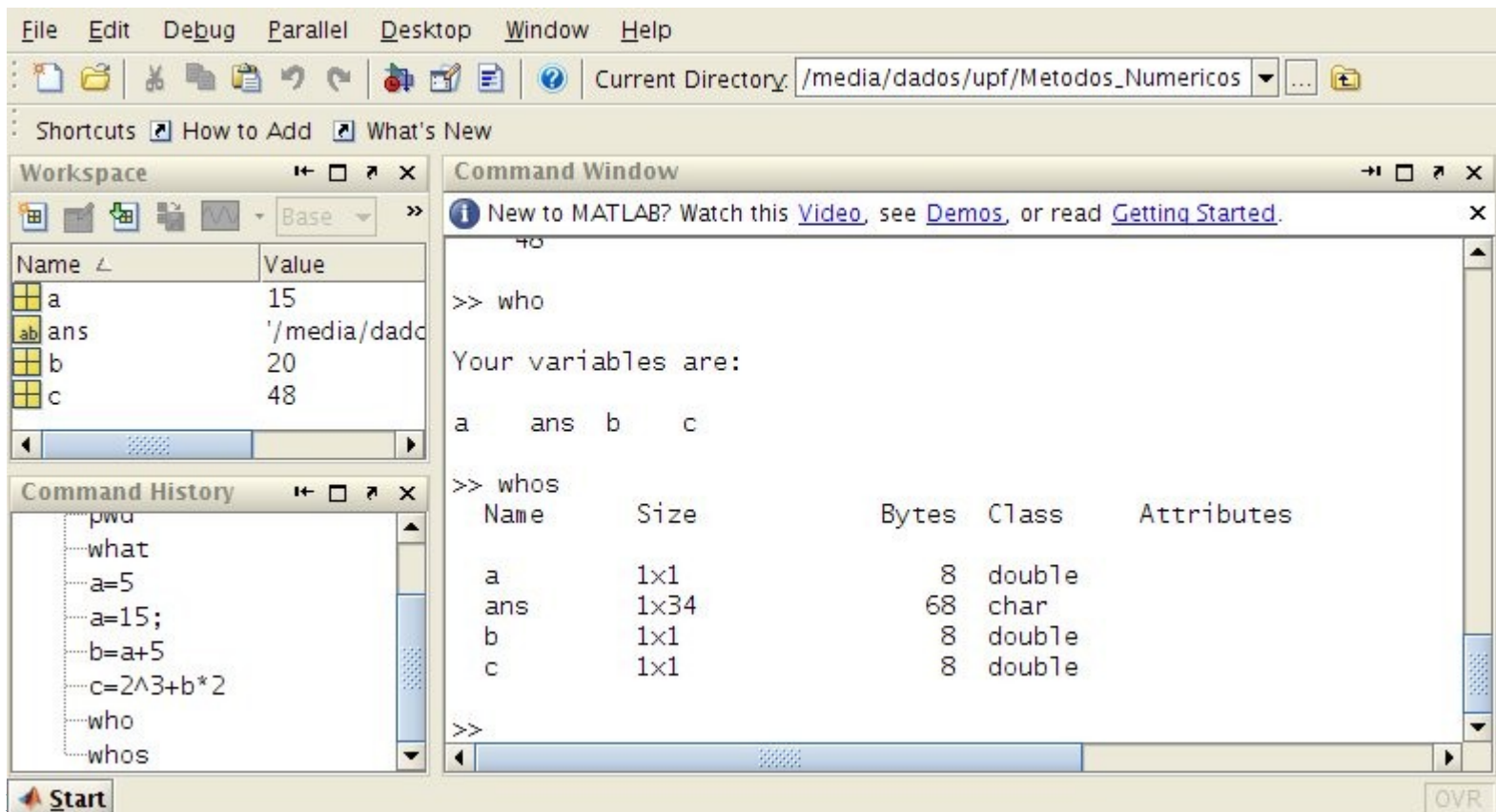
Listar variáveis usadas atualmente: `>> who`



Comandos de uso do MATLAB:

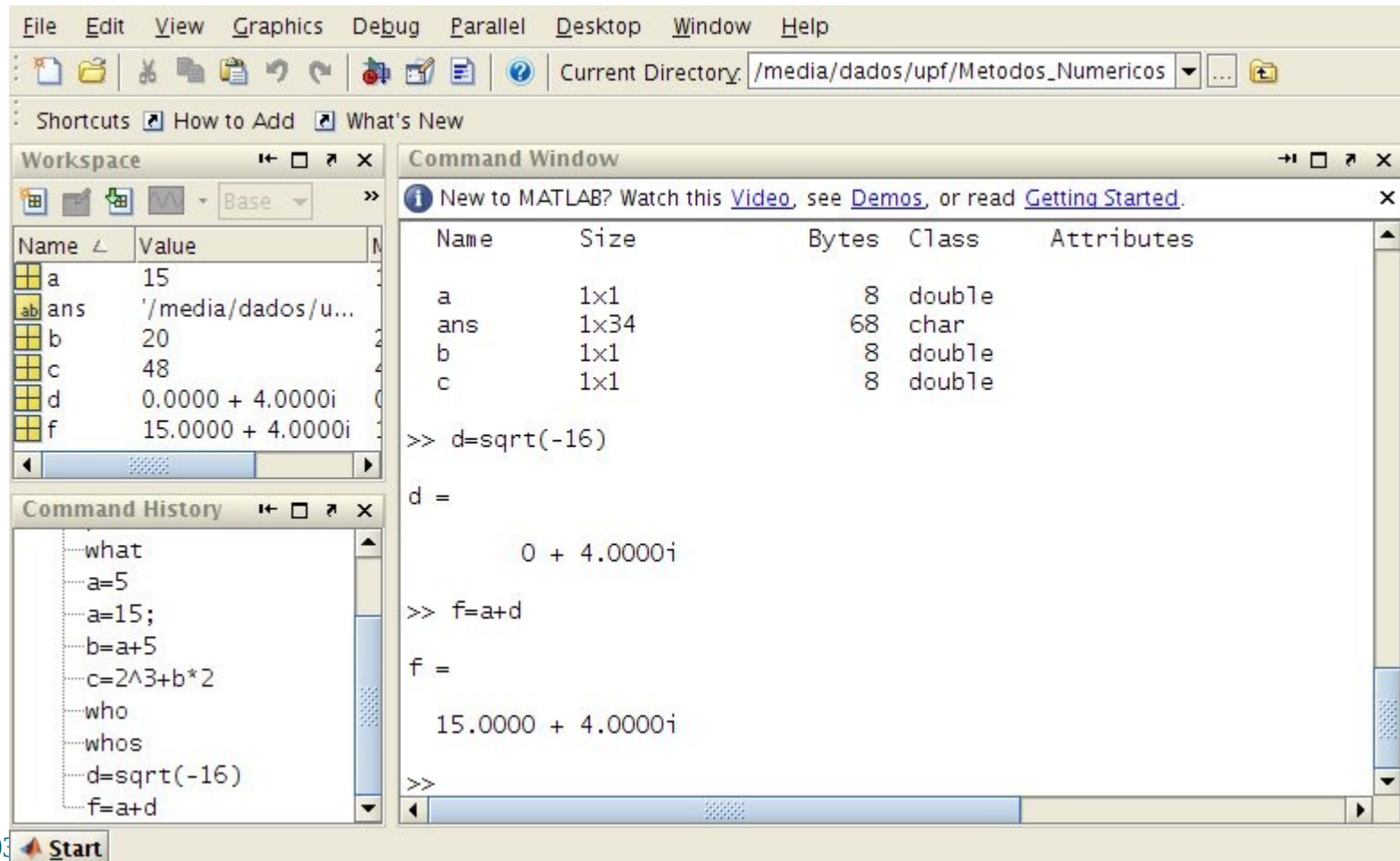
Listar variáveis usadas atualmente: `>> who`

Listar variáveis e detalhes: `>> whos`



Comandos de uso do MATLAB:

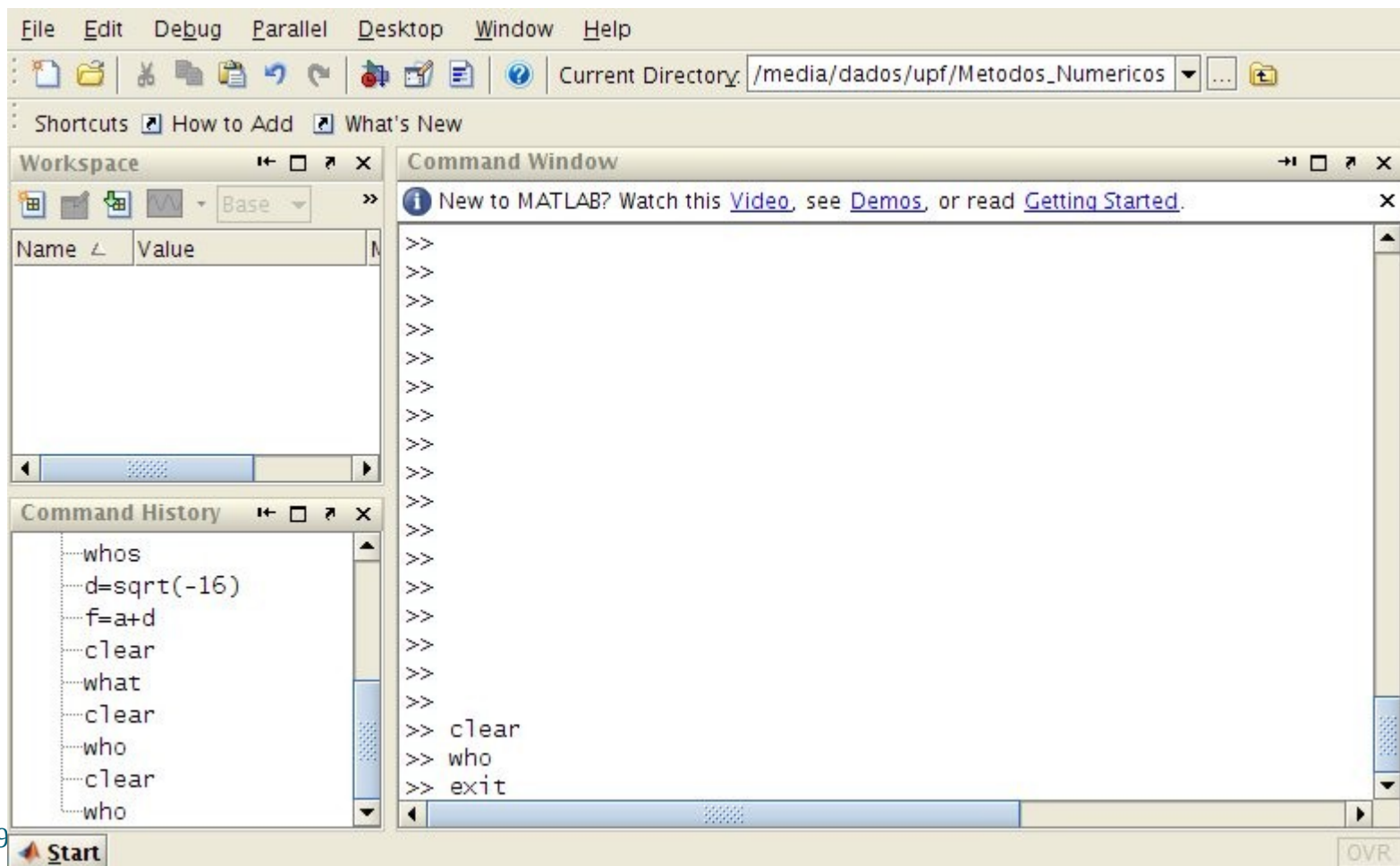
Variáveis Complexas:



Comandos de uso do MATLAB:

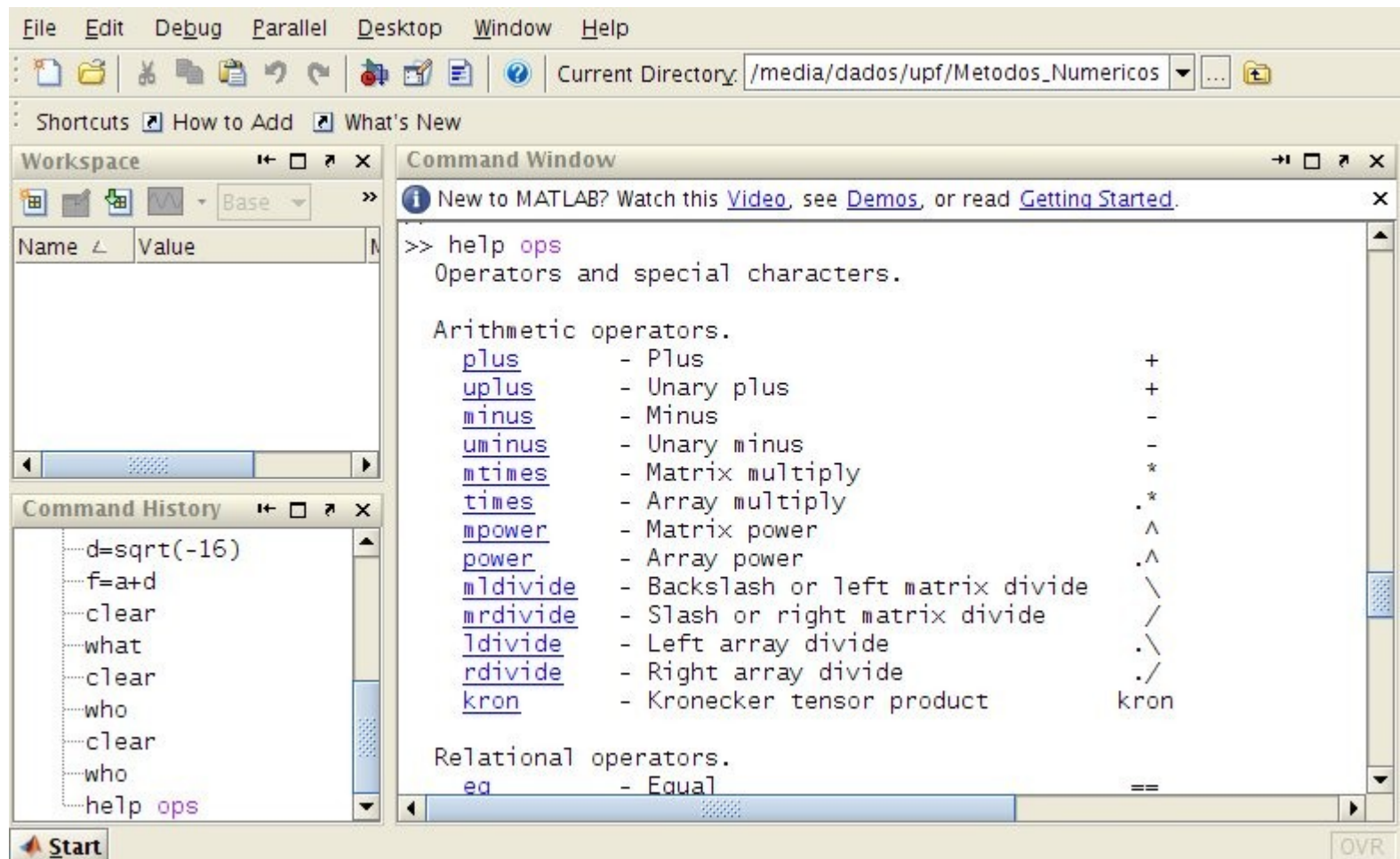
Limpar variáveis do ambiente de trabalho: `>> clear`

Sair do Matlab: `>> exit`



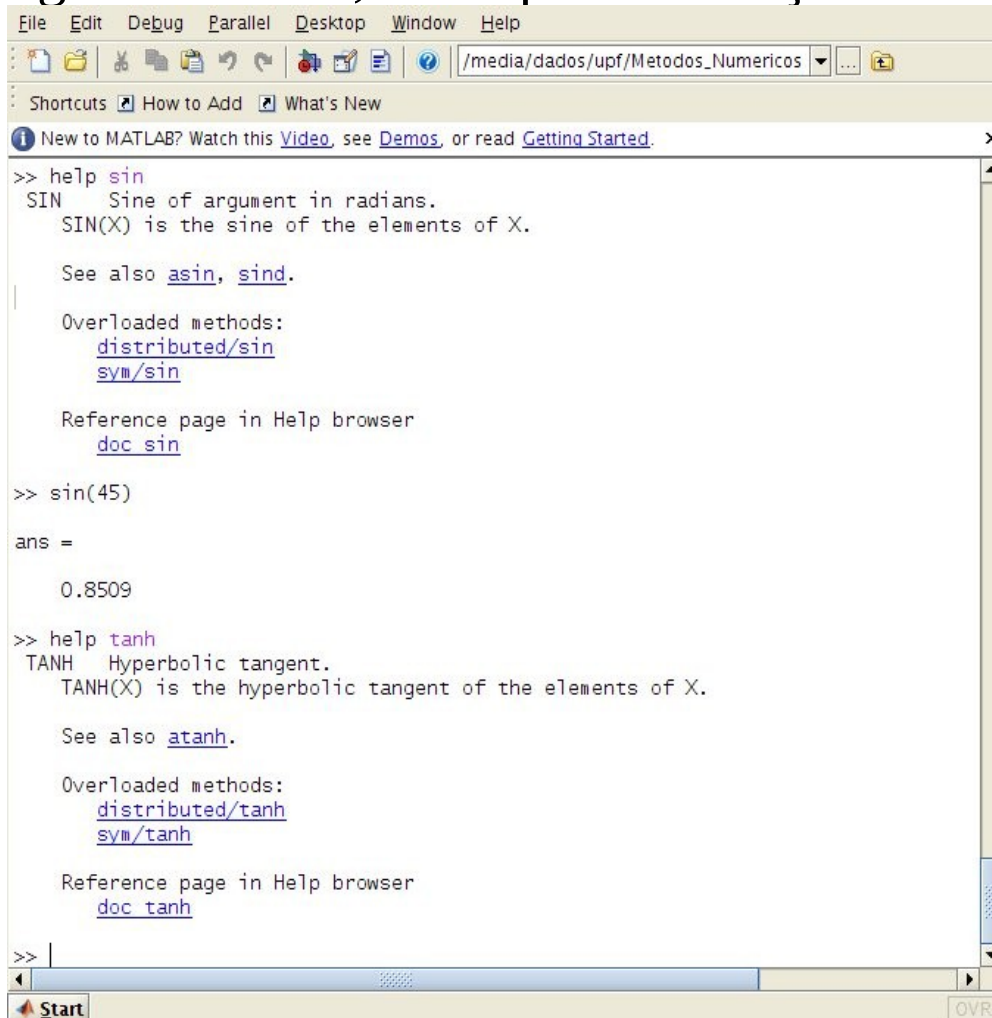
Comandos simples no MATLAB

Adição, Subtração, Multiplicação, Divisão, Exponenciação:



Comandos simples no MATLAB

Funções Trigonômicas, Exemplos de funções matemáticas:



The screenshot shows the MATLAB Command Window interface. At the top, there is a menu bar with 'File', 'Edit', 'Debug', 'Parallel', 'Desktop', 'Window', and 'Help'. Below the menu bar is a toolbar with various icons. A path bar shows the current directory as '/media/dados/upf/Metodos_Numericos'. Below the path bar, there are links for 'Shortcuts', 'How to Add', and 'What's New'. A message box at the top says 'New to MATLAB? Watch this Video, see Demos, or read Getting Started.' The main area of the window contains the following text:

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

       See also asin, sind.

       Overloaded methods:
           distributed/sin
           sym/sin

       Reference page in Help browser
           doc sin

>> sin(45)

ans =

    0.8509

>> help tanh
TANH    Hyperbolic tangent.
       TANH(X) is the hyperbolic tangent of the elements of X.

       See also atanh.

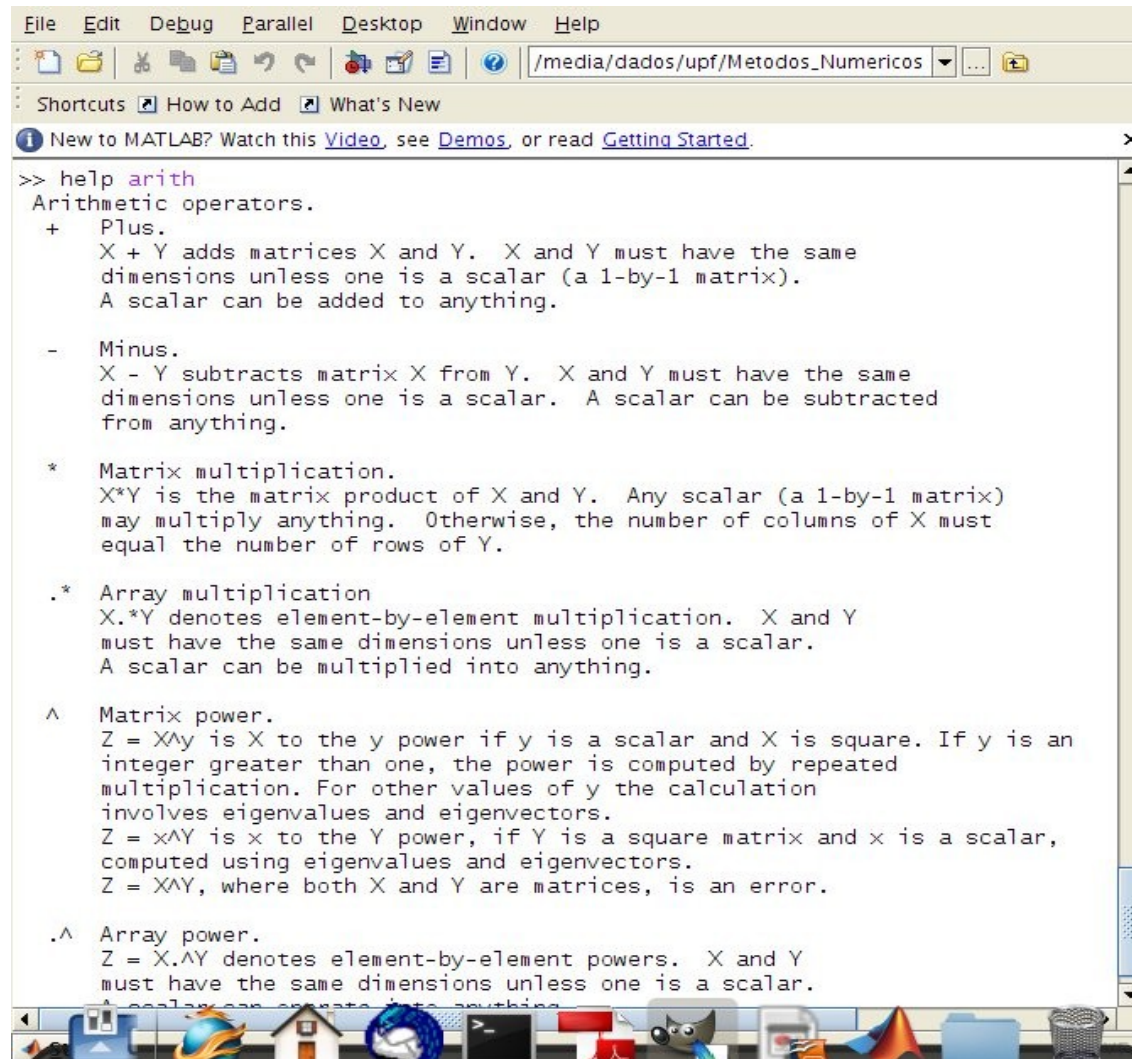
       Overloaded methods:
           distributed/tanh
           sym/tanh

       Reference page in Help browser
           doc tanh

>> |
```

At the bottom of the window, there is a status bar with a 'Start' button and a 'OVR' indicator.

Operações com Matrizes



The screenshot shows the MATLAB Command Window with the following content:

```
>> help arith
Arithmetic operators.
+ Plus.
  X + Y adds matrices X and Y. X and Y must have the same
  dimensions unless one is a scalar (a 1-by-1 matrix).
  A scalar can be added to anything.

- Minus.
  X - Y subtracts matrix X from Y. X and Y must have the same
  dimensions unless one is a scalar. A scalar can be subtracted
  from anything.

* Matrix multiplication.
  X*Y is the matrix product of X and Y. Any scalar (a 1-by-1 matrix)
  may multiply anything. Otherwise, the number of columns of X must
  equal the number of rows of Y.

.* Array multiplication
  X.*Y denotes element-by-element multiplication. X and Y
  must have the same dimensions unless one is a scalar.
  A scalar can be multiplied into anything.

^ Matrix power.
  Z = X^y is X to the y power if y is a scalar and X is square. If y is an
  integer greater than one, the power is computed by repeated
  multiplication. For other values of y the calculation
  involves eigenvalues and eigenvectors.
  Z = x^Y is x to the Y power, if Y is a square matrix and x is a scalar,
  computed using eigenvalues and eigenvectors.
  Z = X^Y, where both X and Y are matrices, is an error.

.^ Array power.
  Z = X.^Y denotes element-by-element powers. X and Y
  must have the same dimensions unless one is a scalar.
  A scalar can operate on anything.
```

Operações com Matrizes

Declarar vetores e matrizes:

```
>> a=[1 2 3]
```

```
a =
```

```
    1    2    3
```

```
>> b=[2,3,4]
```

```
b =
```

```
    2    3    4
```

```
>>
```

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

```
c =
```

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

```
>> d=[1 2;3,4]
```

```
d =
```

```
    1    2  
    3    4
```

```
>>
```

Operações com Matrizes

Operações com matrizes:

```
>> whos
```

Name	Size	Bytes	Class	Attributes
a	1x3	24	double	
ans	1x1	8	double	
b	1x3	24	double	
c	3x3	72	double	
d	2x2	32	double	

```
>> e=a+b
```

```
e =
```

```
     3     5     7
```

```
>>
```


Operações com Matrizes

Operações
com
matrizes:

```
>> whos
```

Name	Size	Bytes	Class	Attributes
a	1x3	24	double	
ans	1x1	8	double	
b	1x3	24	double	
c	3x3	72	double	
d	2x2	32	double	

```
>> f=a*b  
??? Error using ==> mtimes  
Inner matrix dimensions must agree.
```

```
>> f=a*c
```

```
f =
```

```
    30    36    42
```

```
>>
```

Operações com Matrizes

Operações
com
matrizes:

```
>> whos
```

Name	Size	Bytes	Class	Attributes
a	1x3	24	double	
ans	1x1	8	double	
b	1x3	24	double	
c	3x3	72	double	
d	2x2	32	double	

```
>> g=c*b  
??? Error using ==> mtimes  
Inner matrix dimensions must agree.
```

```
>> g=c*b'
```

```
g =
```

```
20  
47  
74
```

```
>>
```

Operações com Matrizes

```
>> b=rand(3,3)
```

```
b =
```

```
    0.8147    0.9134    0.2785  
    0.9058    0.6324    0.5469  
    0.1270    0.0975    0.9575
```

```
>> h=b*c
```

```
h =
```

```
    6.4177    8.4243   10.4309  
    7.2634    9.3484   11.4335  
    7.2197    8.4017    9.5838
```

Operações
com
matrizes:

```
>> >> whos
```

Name	Size	Bytes	Class	Attributes
a	1x3	24	double	
ans	1x1	8	double	
b	3x3	72	double	
c	3x3	72	double	
d	2x2	32	double	
e	1x3	24	double	
f	1x3	24	double	
g	3x1	24	double	
h	3x3	72	double	

Operações com Matrizes

Resolução
de Sistemas
de
Equações:

```
>> clear  
>> a=[2 2 4 -2; 1 3 2 1; 3 1 3 1; 1 3 4 2]
```

```
a =
```

```
     2     2     4    -2  
     1     3     2     1  
     3     1     3     1  
     1     3     4     2
```

```
>> b=[10 17 18 27];  
>> x=a\b  
??? Error using ==> mldivide  
Matrix dimensions must agree.
```

```
>> x=a\b'
```

```
x =
```

```
1.0000  
2.0000  
3.0000  
4.0000
```

```
>>
```