

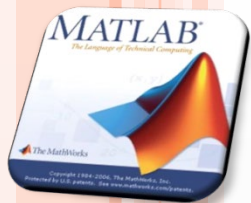
# فصل دوم: آرایه و ماتریس ها

مقدمه ای بر ماتریس ها:

The screenshot shows the MATLAB environment. The **Workspace** window displays a variable `c` with the value `[1;2;3;4;5]`. The **Command Window** shows the following code and output:

```
To get started, select MATLAB Help or Demos from the Help menu.  
>> c=[1;2;3;4;5 ]  
  
c =  
  
    1  
    2  
    3  
    4  
    5  
  
>>
```

The **Command History** window at the bottom shows a list of previous commands and their execution times.



# فصل دوم: آرایه و ماتریس ها

مقدمه ای بر ماتریس ها:

The screenshot shows the MATLAB environment with the following components:

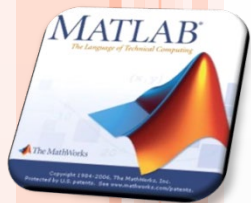
- Workspace:** A table listing variables 'a', 'b', and 'c' with their respective values.
- Command Window:** Shows the execution of `a = [1:5]` and `b = a(1)`, resulting in a row vector `a = [1 2 3 4 5]` and a scalar `b = 1`.
- Command History:** A list of recent commands and their execution times.

Name	Value
a	[1 2 3 4 5]
b	[1;2;3;4;5]
c	[1;2;3;4;5]

```
>> a = [1:5]
a =
     1     2     3     4     5
>> b = a(1)
b =
     1
     2
     3
     4
     5
>>
```

Time	Command
6/10/03 2:18 AM	---
6/10/03 3:08 AM	---
6/10/03 3:16 AM	---
6/10/03 3:18 AM	---
6/10/03 3:28 AM	---
6/10/03 3:47 AM	---
6/10/03 5:06 AM	---

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# فصل دوم: آرایه و ماتریس ها

مقدمه ای بر ماتریس ها:

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

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

g =

     1     2     3
     4     5     6

>> g=[1 2 3
4 5 6]

g =

     1     2     3
     4     5     6

>> h=[1 2 3;4 5 6 7]
??? Error using ==> vertcat
All rows in the bracketed expression must have the same
number of columns.

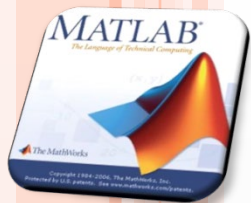
>>
```

The Workspace window shows the following variables:

Name	Value
a	[1 2 3 4 5]
b	[1;2;3;4;5]
c	[1 2 3 4 5]
g	[1 2 3;4 5 6]

The Command History window shows the following entries:

```
%-- 6/10/03 2:18 AM --%
%-- 6/10/03 3:08 AM --%
%-- 6/10/03 3:16 AM --%
%-- 6/10/03 3:18 AM --%
%-- 6/10/03 3:28 AM --%
%-- 6/10/03 3:47 AM --%
%-- 6/10/03 5:06 AM --%
```

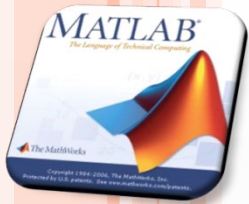


# فصل دوم: آرایه و ماتریس ها

عملیات ریاضی بر روی ماتریس ها:  
✓ عملیات ریاضی اسکالر-آرایه

The screenshot shows the MATLAB environment. The workspace contains two variables: 'ans' and 'h', both of type '3x4 double'. The command window shows the following code and output:

```
>> h=[1 2 3 4  
5 6 7 8  
9 10 11 12]  
  
h =  
  
     1     2     3     4  
     5     6     7     8  
     9    10    11    12  
  
>> h-2  
  
ans =  
  
    -1     0     1     2  
     3     4     5     6  
     7     8     9    10  
  
>>
```



# فصل دوم: آرایه و ماتریس ها

عملیات ریاضی بر روی ماتریس ها:  
✓ عملیات ریاضی درایه-درایه

The screenshot shows the MATLAB environment. The **Workspace** window displays the following variables:

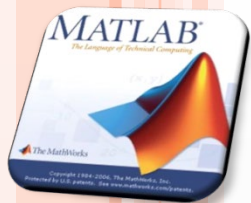
Name	Value
ans	[4 0 10; 18 0 28]
g	[4 0 5; 6 0 7]
h	[1 0 2; 3 0 4]

The **Command Window** shows the following session:

```
>> h=[1 0 2;3 0 4];g=[4 0 5;6 0 7];  
>> h.*g  
  
ans =  
  
     4     0    10  
    18     0    28  
  
>> h*g  
??? Error using ==> mtimes  
Inner matrix dimensions must agree.  
  
>>
```

The **Command History** window shows a list of commands and their execution times, such as:

- 6/10/03 2:18 AM
- 6/10/03 3:08 AM
- 6/10/03 3:16 AM
- 6/10/03 3:18 AM
- 6/10/03 3:28 AM
- 6/10/03 3:47 AM
- 6/10/03 5:06 AM



# فصل دوم: آرایه و ماتریس ها

عملیات ریاضی بر روی ماتریس ها:  
✓ عملیات ریاضی ماتریسی

```
MATLAB
File Edit Debug Desktop Window Help
Current Directory: C:\Program Files\MATLAB71\work
Shortcuts How to Add What's New

Workspace
Name Value
ans <3x4 double>
g <3x4 double>
h <3x4 double>

Command Window
>> h=[1 1 1 1;2 2 2 2;3 3 3 3];
>> g=[1 2 3 4
5 6 7 8
9 10 11 12];
>> g.^2

ans =

     1     4     9    16
    25    36    49    64
    81   100   121   144

>> g.^-1

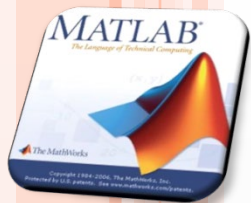
ans =

    1.0000    0.5000    0.3333    0.2500
    0.2000    0.1667    0.1429    0.1250
    0.1111    0.1000    0.0909    0.0833

>>
```

Command History

Time	Command
6/10/03 2:18 AM	%--
6/10/03 3:08 AM	%--
6/10/03 3:16 AM	%--
6/10/03 3:18 AM	%--
6/10/03 3:28 AM	%--
6/10/03 3:47 AM	%--
6/10/03 5:06 AM	%--



# فصل دوم: آرایه و ماتریس ها

روش های دستکاری ماتریس ها:

The screenshot shows the MATLAB interface with the following content:

**Workspace:**

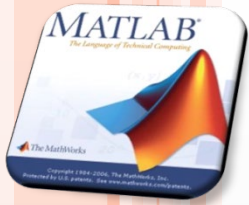
Name	Value
A	<3x6 double>
ans	9

**Command Window:**

```
To get started, select MATLAB Help or Demos from the Help menu.  
  
>> A=[1 2 3;4 5 6;7 8 9]  
  
A =  
  
    1    2    3  
    4    5    6  
    7    8    9  
  
>> A(3,3)  
  
ans =  
  
    9  
  
>> A(2,6)=1  
  
A =  
  
    1    2    3    0    0    0  
    4    5    6    0    0    1  
    7    8    9    0    0    0  
  
>>
```

**Command History:**

Time	Command
6/10/03 2:18 AM	>> A=[1 2 3;4 5 6;7 8 9]
6/10/03 3:08 AM	>> A(3,3)
6/10/03 3:16 AM	>> A(2,6)=1
6/10/03 3:18 AM	>>
6/10/03 3:28 AM	>>
6/10/03 3:47 AM	>>
6/10/03 5:06 AM	>>



# فصل دوم: آرایه و ماتریس ها

روش های دستکاری ماتریس ها:

برای دسترسی به یک سطر یا ستون از عملگر : استفاده می شود.

مثال:

```
v=[ 1 2 3 ;2 5 6 ; 4 3 2]
```

```
1: v(1, :)
```

```
2: v(:, 2)
```

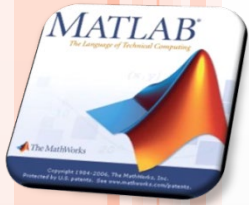
```
3: v(1:2, 2:end)
```

1: سطر یک را نشان می دهد

2: ستون 2 را نشان می دهد

3: سطرها 1 و 2 را نمایش بدهد از ستون 2 تا به آخر.





# فصل دوم: آرایه و ماتریس ها

روش های دستکاری ماتریس ها:

**Workspace**

Name	Value
A	[1 2 3; 4 5 6; 7 8 9]
B	[7 8 9; 4 5 6; 1 2 3]
ans	9

**Command Window**

```
>> A=[1 2 3
4 5 6
7 8 9];
>> B=A(3:-1:1, 1:3)

B =

     7     8     9
     4     5     6
     1     2     3

>> B=A(3:-1:1, :)

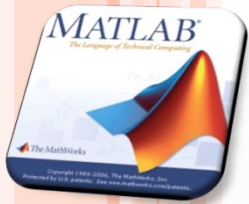
B =

     7     8     9
     4     5     6
     1     2     3

>>
```

**Command History**

Command	Time
6/10/03 2:18 AM	--%
6/10/03 3:08 AM	--%
6/10/03 3:16 AM	--%
6/10/03 3:18 AM	--%
6/10/03 3:28 AM	--%
6/10/03 3:47 AM	--%
6/10/03 5:06 AM	--%



# فصل دوم: آرایه و ماتریس ها

روش های دستکاری ماتریس ها:

Workspace

Name	Value
A	[1 2 3;4 5 6;7 8 9]
B	[7 8 9;4 5 6;1 2 3]
C	<3x5 double>
ans	9

Command Window

```
>> B=A(3:-1:1,1:3)
B =
     7     8     9
     4     5     6
     1     2     3

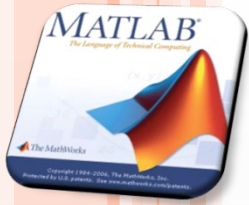
>> B=A(3:-1:1,:)
B =
     7     8     9
     4     5     6
     1     2     3

>> C=[A B(:, [1 3])]
C =
     1     2     3     7     9
     4     5     6     4     6
     7     8     9     1     3

>>
```

Command History

Time	Command
6/10/03 2:18 AM	
6/10/03 3:08 AM	
6/10/03 3:16 AM	
6/10/03 3:18 AM	
6/10/03 3:28 AM	
6/10/03 3:47 AM	
6/10/03 5:06 AM	



# فصل دوم: آرایه و ماتریس ها

روش های دستکاری ماتریس ها:

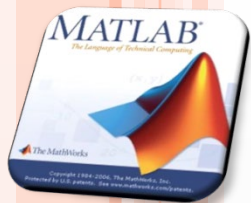
```
Current Directory
History
1/03 2:18 AM --%
1/03 3:08 AM --%
1/03 3:16 AM --%
1/03 3:18 AM --%
1/03 3:28 AM --%
1/03 3:47 AM --%
1/03 5:06 AM --%

>> F=[A(1,1),A(1,3);A(3,1),A(3,3)]

F =

     1     3
     7     9

>>
```



# فصل دوم: آرایه و ماتریس ها

روش های دستکاری ماتریس ها:

The screenshot shows the MATLAB environment with the following components:

- Workspace:** A table listing variables and their values.
- Command Window:** Shows the execution of MATLAB commands and their outputs.
- Command History:** Lists previous commands and their execution times.

Name	Value
A	[1 2 3; 4 5 6; 7 8 9]
B	[1 4 7; 3 6 9]
C	<3x5 double>
D	[2 3; 5 6]
E	[1 3]
F	[1 3; 7 9]
ans	9

```
>> B=A
B =
     1     2     3
     4     5     6
     7     8     9

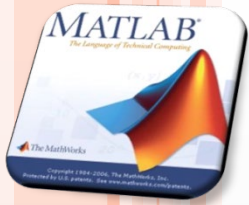
>> B(:,2)=[]
B =
     1     3
     4     6
     7     9

>> B=B.'
B =
     1     4     7
     3     6     9

>>
```

Command History:

Command	Time
6/10/03 2:18 AM	
6/10/03 3:08 AM	
6/10/03 3:16 AM	
6/10/03 3:18 AM	
6/10/03 3:28 AM	
6/10/03 3:47 AM	
6/10/03 5:06 AM	



# فصل دوم: آرایه و ماتریس ها

روش های دستکاری ماتریس ها:

The screenshot shows the MATLAB environment with the following components:

- Workspace:** A table listing variables and their values.
- Command Window:** Shows the execution of commands and their results.
- Command History:** Lists previous commands and their execution times.

Name	Value
c	[3 4]
d	<3x4 double>
e	<3x4 double>
v	[2;4;8]

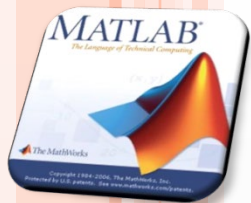
```
>> d
d =
     1     2     3     4
     5     6     7     8
     9    10    11    12

>> c=size(d)
c =
     3     4

>>
```

Command History:

- 6/10/03 2:18 AM -->
- 6/10/03 3:08 AM -->
- 6/10/03 3:16 AM -->
- 6/10/03 3:18 AM -->
- 6/10/03 3:28 AM -->
- 6/10/03 3:47 AM -->
- 6/10/03 5:06 AM -->



# فصل دوم: آرایه و ماتریس ها

روش های دستکاری ماتریس ها:

The screenshot shows the MATLAB environment with the following components:

- Workspace:** A table listing variables and their values.
- Command Window:** A log of executed commands and their outputs.
- Command History:** A list of previously executed commands with timestamps.

Name	Value
c	[3 4]
d	<3x4 double>
e	<3x4 double>
k	[1 2 6 7]
s	4
v	[2;4;8]
x	[-3 -2 -1 0 1 2 3]
y	[-3 -2 2 3]

```
>> x=-3:3
x =
    -3    -2    -1     0     1     2     3

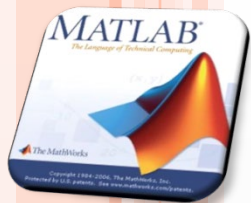
>> k=find(abs(x)>1)
k =
     1     2     6     7

>> y=x(k)
y =
    -3    -2     2     3

>>
```

Command History:

```
%-- 6/10/03 2:18 AM --%
%-- 6/10/03 3:08 AM --%
%-- 6/10/03 3:16 AM --%
%-- 6/10/03 3:18 AM --%
%-- 6/10/03 3:28 AM --%
%-- 6/10/03 3:47 AM --%
%-- 6/10/03 5:06 AM --%
```



# فصل دوم: آرایه و ماتریس ها

معرفی چند تابع برای کار با ماتریس ها:

The screenshot shows the MATLAB environment with the following components:

- Workspace:** A table listing variables in the workspace.

Name	Value
a	<4x3 double>
ans	[6;15;24;33]
b	<3x4 double>

- Command Window:** Shows the execution of MATLAB commands and their results.

```
>> a=[1 2 3;4 5 6;7 8 9;10 11 12];
>> sum(a)

ans =

    22    26    30

>> b=a';
>> sum(b);
>> (sum(a'))'
```

The output for the second set of commands is:

```
ans =

     6
    15
    24
    33
```
- Command History:** A list of previously executed commands with timestamps.