



Chapitre 2 : Manipulation des Matrices avec Matlab

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Matière : Outils de Programmation 2

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Agrégation de Matrices

```
>> C1 = [10 20];
```

```
>> C2 = [30 40];
```

```
>> C = [C1 , C2 ]
```

```
C =
```

10	20	30	40
----	----	----	----

```
>> D = [C1 ; C2 ]
```

```
D =
```

10	20
30	40

```
>> D = [D ; 50 60]
```

```
D =
```

10	20
30	40
50	60

Extraction des Éléments d'une Matrice

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

```
A =
```

1	2	3
4	5	6

```
>> A(2,1)
```

```
ans =
```

4

```
>> A(1,:) 
```

```
ans =
```

1	2	3
---	---	---

```
>> A(:,3)
```

```
ans =
```

3
6

```
>> A( : , [1,3] )
```

```
ans =
```

1	3
4	6

Modifier les Eléments d'une Matrice

```
>> B = A;
```

```
>> B( 1 , 2 ) = 200
```

```
B =
```

1	200	3
4	5	6

```
>> B( 2, :) = [ 400 500 600]
```

```
B =
```

1	200	3
400	500	600

```
>> B(:, [1,3] ) = [ 11 33 ; 44 66]
```

```
B =
```

11	200	33
44	500	66

Arithmétique des Matrices

```
>> 2 * A + I
```

```
ans =
```

```
    3    5    7  
    9   11   13
```

```
>> A + B
```

```
ans =
```

```
    2    4    3  
    8   10    6
```

```
>> A * B'
```

```
ans =
```

```
    5   14  
   14   41
```

```
>> sin(A)
```

```
ans =
```

```
    0.8415    0.9093    0.1411  
   -0.7568   -0.9589   -0.2794
```

Opérations Point par Point

```
>> A.*B
```

```
ans =
```

```
1    4    0  
16   25   0
```

```
>> A.^2
```

```
ans =
```

```
1    4    9  
16   25   36
```

```
>> A./2
```

```
ans =
```

```
0.5000    1.0000    1.5000  
2.0000    2.5000    3.0000
```

Comparaison des Matrices

```
>> A >= 3
```

```
ans =
```

```
0  0  1  
1  1  1
```

```
>> B = A ; B(:, 3) = 0
```

```
B =
```

```
1  2  0  
4  5  0
```

```
>> A == B
```

```
ans =
```

```
1  1  0  
1  1  0
```

```
>> A >= B
```

```
ans =
```

```
1  1  1  
1  1  1
```

Fonctions *any* et *all*

- `any(x)` : renvoie 1 si au moins un des éléments de `x` n'est pas nul :

```
>> V = [0 0 4 0] ;
```

```
>> any(V)
```

```
ans =
```

```
1
```

- `all(x)` : renvoie 1 si tous les éléments de `x` ne sont pas nuls :

```
>> W = 1:4;
```

```
>> all(W)
```

```
ans =
```

```
1
```

```
>> all(V)
```

```
ans =
```

```
0
```


Matrices Spéciales

- Matrice identité :

```
>> I = eye(3,3)
```

```
I =
```

```
1    0    0
0    1    0
0    0    1
```

- Matrice nulle :

```
>> Z = zeros(3,2)
```

```
Z =
```

```
0    0
0    0
0    0
```

- Matrice unité

```
>> U = ones(2,3)
```

```
U =
```

```
1    1    1
1    1    1
```

- Matrice vide :

```
>> E = []
```

```
E =
```

```
[]
```

```
>> size(E)
```

```
ans =
```

```
0    0
```

```
>> A
```

```
A =
```

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

```
>> A(:, 2) = []
```

```
A =
```

```
1    3
4    6
```

Nombres Complexes

- Pour Matlab, i (ou j) est le nombre complexe tel que $i^2 = -1$

```
>> i
```

```
ans =
```

```
0 + 1.0000i
```

```
>> i^2
```

```
ans =
```

```
-1
```

```
>> z1 = 4 - 3i
```

```
z1 =
```

```
4.0000 - 3.0000i
```

```
>> conj(z1)
```

```
ans =
```

```
4.0000 + 3.0000i
```

```
>> z1 * ans
```

```
ans =
```

```
25
```

```
>> real(z1)
```

```
ans =
```

```
4
```

```
>> imag(z1)
```

```
ans =
```

```
-3
```

- Matrice de nombre complexe

```
> z1 * ones(2,2)
```

```
ans =
```

```
4.0000 - 3.0000i  4.0000 - 3.0000i
```

```
4.0000 - 3.0000i  4.0000 - 3.0000i
```