

## MATLAB handout for Chapter 3

- **Entering matrices in matlab**

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

produces the matrix

$A =$

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

After entering the matrix  $A$ , check what happens with commands

```
>> size(A)
```

```
>> A(2,3)
```

```
>> A(3,1)
```

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

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

- **Special matrices in matlab**

Play with following commands and see what happens

```
>> eye(3)
```

```
>> zeros(3)
```

```
>> zeros(3,4)
```

```
>> diag([1 2 3])
```

```
>> ones(4)
```

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

```
>> randint(3)
```

```
>> randint(3,4)
```

```
>> randint(3,4,5)
```

```
>> randint(3,4,9)
```

After playing, can you see what happens with `>>randint` command?

To find more try  
`>>help randint`

- **Matrix operations in matlab**

- ❖ Addition `>> A + B`
- ❖ Subtraction `>> A - B`
- ❖ Scalar Multiplication `>> 3 * A`
- ❖ Mutiplication `>> A * B`

Example:

```
>> A = [2 -1 0; 4 3 -1]
```

```
A =  
    2   -1    0  
    4    3   -1
```

```
>> B = [-4 0; 6 -4; 1 6]
```

```
B =  
   -4    0  
    6   -4  
    1    6
```

```
>> C = A * B           produces
```

```
C =  
  -14    4  
    1  -18
```

- **Matrix inverse**

```
>> inv(A)  gives inverse of matrix A
```

Example:

```
>> A = [1 4 8; 1 0 0; 1 -3 -7]
```

```
A =  
    1    4    8  
    1    0    0  
    1   -3    7
```

```
>> B = inv(A)  produces
```

```
B =  
    0    1    0  
   1.75  3.75    2  
  -0.75  1.75   -1
```

The command `>> rats(B)` converts the decimal values of  $B$  into rational fractions.

```
>> C = rats(B)           {Check the output you get after this command}
```

- **Determinants**

`>> det(A)` computes the determinant of  $A$ .

- **Reduced echelon form**

`>> rref(A)` produces reduced echelon form of  $A$

`>> rrefmovie(A)` produces echelon form as well as shows the steps.

Example:

`>> Aug = [2 -1 1 1; 1 1 -1 2; 3 -1 1 0]`

$Aug =$

$$\begin{array}{cccc} 2 & -1 & 1 & 1 \\ 1 & 1 & -1 & 2 \\ 3 & -1 & 1 & 0 \end{array}$$

`>> C = rref(Aug)`

$C =$

$$\begin{array}{cccc} 1 & 0 & 0 & 0 \\ 0 & 1 & -1 & 0 \\ 0 & 0 & 0 & 1 \end{array}$$

*End of handout.*