

The MatLab Language

Mathematics Laboratory

The MathWorks

www.mathworks.com

General

- Comments – “%” in first column
- Result Control - “;” at the end
- “x=5”

x =

5

- “x=7;”

“x”

x =

7

General (continued)

- Range Operator

- "x=3:2:13"

- x =

- 3 5 7 9 11 13

- Line Continuation - three periods

- Directory

- "dir"

- announ~2.doc mathview.doc matlab_6.doc matlab~2.doc

- intro.m matlab.doc matlab~1.doc vector.m announ~1.doc

- language.m matlab1.doc matlab~1.ppt

General (continued)

- Print Working Directory

- "pwd"

- ans =

- E:\DOC\JEFF\COURSES\BEI\SHORTC~1\MATLAB

- Change Directory - cd

- "cd .."

- "pwd"

- ans =

- E:\DOC\JEFF\COURSES\BEI\SHORTC~1

General (continued)

– "cd matlab"

– "pwd"

ans =

E:\DOC\JEFF\COURSES\BEI\SHORTC~1\MATLAB

Scalars, Vectors, and Matrices

- Creating a row vector
 - "X=[1,2,3] or X=[1 2 3]"
X =
1 2 3
- Creating a column vector
 - "Y=[1;2;3]" or "Y=[1
2
3]"
Y =
1
2
3

Vector / Matrix Operations

- "Z=[y,2*y,3*y]" creates ?

- Z =

1 2 3

2 4 6

3 6 9

Indexing

- "Z(2,3)=?"

ans =

6

- "W=Z(1:2,2:3)"

W =

2 3

4 6

- "W=Z(:,2)"

W =

2

4

6

Indexing (Continued)

- "W=Z(2,:)"

W =

2 4 6

- "Z(2,:)= [6,4,2] does ?"

Z =

1 2 3

6 4 2

3 6 9

- "Z(2,:)= [] does ?"

Z =

1 2 3

3 6 9

Matrix Operations

- $A+B$ - Addition, element by element

- "ZZ=[1,1,1;2,2,2]"

ZZ =

1 1 1

2 2 2

- "W=Z+ZZ"

W =

2 3 4

5 8 11

Matrix Operations (Continued)

- A' - Transpose
- $A*B$ - Matrix Multiplication

– " $ZZ=ZZ'$ "

$ZZ =$

1 2

1 2

1 2

– " $W=Z*ZZ'$ "

$W =$

6 12

18 36

Matrix Operations (Continued)

- $A.*B$ - Element by Element Multiply
- Also: A/B , $A\backslash B$, $A./B$, $A.^2$
- Reserved Symbols
 - Scalars: π , i , j , inf , NaN , clock , date , ans
 - "x=pi"
 $x =$
 3.1416
 - "x=i"
 $x =$
 $0 + 1.0000i$

Scalars (Continued)

- "x=j"

$$x =$$

$$0 + 1.0000i$$

Matrices: zeros, ones, eye

- "zeros(3,5)"

ans =

| | | | | |
|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 |

Matrices (Continued)

- "ones(5,3)"

ans =

| | | |
|---|---|---|
| 1 | 1 | 1 |
| 1 | 1 | 1 |
| 1 | 1 | 1 |
| 1 | 1 | 1 |
| 1 | 1 | 1 |

Matrices (Continued)

- "eye(4)" - the identity matrix

ans =

| | | | |
|---|---|---|---|
| 1 | 0 | 0 | 0 |
| 0 | 1 | 0 | 0 |
| 0 | 0 | 1 | 0 |
| 0 | 0 | 0 | 1 |

Relational Operators

- "<" - less than
- "<=" - less than or equal to
- ">" - greater than
- ">=" - greater than or equal to
- "==" - **test** for equality
- "~=" - not equal to
- "&" - AND
- "|" - OR
- "~" - NOT

Control Flow (If)

```
if x>5 & x<8
```

```
-----
```

```
-----
```

```
elseif(x>=8)
```

```
-----
```

```
-----
```

```
else
```

```
-----
```

```
end
```

Control Flow (For Loops)

```
for k=7:21
```

```
    -----
```

```
    -----
```

```
end
```

Control Flow (While Loops)

```
k=1;
```

```
while k=<10
```

```
-----
```

```
-----
```

```
    k=k+1;
```

```
end
```