

Some Basic MATLAB used in Math 221

Michael Penna, Indiana University – Purdue University, Indianapolis

Command Line Structure

If a command is terminated with a semi-colon (with a “;”) then its output is not echoed.

```
>> help <command>   Provide help about <command>.
>> helpdesk         Open MATLAB's HelpDesk.
```

Standard Operators and Functions

```
+ , - , * , / , ^      Addition, subtraction, multiplication, division, and exponentiation.
abs(x)                 The absolute value  $|x|$  of  $x$ .
sqrt(x)                The square root  $\sqrt{x}$  of  $x$ .
sin(x), cos(x), tan(x),
sec(x), csc(x), cot(x) The standard circular trig functions; the angle  $x$  is in radians.
```

Constants

```
pi is  $\pi$ 
```

General Purpose Commands

```
>> % <junk>             This is a comment. It will be ignored by MATLAB.
>> clear all           Clear MATLAB's memory.
>> close all           Close all of MATLAB's figure windows.
>> a = <value>         Assigns <value> to  $a$ .
>> x = <expression>    Assigns <expression> to  $x$ .
>> f = inline('<expression in x>') Identifies the function  $f(x)$  as <expression in x>.
>> format long         Sets the number of digits to 14.
>> format short        Sets the number of digits to 4.
>> figure(n)           Open Figure Window  $n$ .
>> ezplot(f(x), [a,b]) Graph  $f(x)$  for  $x \in [a, b]$ .
>> ezplot(f(x), [a,b,c,d], figure(n)) Graph  $f(x)$  for  $x \in [a, b]$  and  $y \in [c, d]$  in Figure No.  $n$ .
>> hold on ... hold off Start and stop of figure window graphics control.
>> quit                Terminate this session of MATLAB.
```

Symbolic Toolbox Commands

```
>> syms a b c          Declare the symbolic quantities  $a$ ,  $b$ , and  $c$ .
>> expand(a*(b+c))     Expand  $a(b + c)$ .
>> factor(a*b+a*c)    Factor  $a * b + a * c$ .
>> simplify((x^2-1)/(x-1)) Simplify  $(x^2 - 1)/(x - 1)$ .
>> subs(E,x,y)         Substitute  $y$  for  $x$  in the expression  $E$ .
>> pretty(E)           Write the expression  $E$  in algebraic form.
>> solve(x^2-1,x)      Solve the equation  $x^2 - 1 = 0$  for  $x$ .
>> diff(f(x),x)        Find  $D_x f(x)$ .
>> int(f(x),x)         Find  $\int f(x) dx$ .
>> int(f(x),x,a,b)     Find  $\int_a^b f(x) dx$ .
```

Control Structure

The syntax of a for loop is:

```
>> for <index>=<m>:<n>
    <yada>;
    <yada>;
    <yada>;
end;
```