

UNIVERSITY OF ILLINOIS AT CHICAGO
Mechanical Engineering

IE 446
MATLAB Exercises

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1. The first thing is to make sure that you are not typing in information any more often than you have to. The most straightforward way to do this is with a script file. Make a file called something like `practice.m` or `myname.m`, open it in an editor, and then invoke `matlab` from the directory that contains the file. You can run the script by typing `practice` (or `myname`) on the matlab command line.
Start by entering the data from Montgomery exercise 5.2 as a matrix with four columns and twenty rows. Call this variable whatever you want. Note that if you end an entry with a semi-colon, the answer will not be echoed on the screen, otherwise it will be.

2. The next thing is to be able to manipulate your matrix. Do the following:

- (a) Make a variable that is the transpose of the original matrix.
- (b) Make a variable that is just row 8 of the original matrix.
- (c) Make a variable that is just columns 1 and 2 of the original matrix.

3. Note how matlab works on the entries of a matrix.

- (a) From the original data, make a 20-vector that is the mean of each row.
- (b) Make a 20-vector that is the max of each row.
- (c) Make a 20-vector that is the min of each row.
- (d) Use the last two to make a 20-vector that is the range of each row of the original data.
- (e) Make an 80-vector that includes all of the original data in a single row or column.

4. Another crucial thing is to know how to plot. Make a vector that is just the integers 1 to 20. (Try `help linspace` to avoid unnecessary typing.) Use this vector to plot the points that would appear on an \bar{x} chart for the data.

Add some control limits to your plot. You may need the function `hold`.

5. Another very useful thing is a function, which is similar to a script but takes arguments. Put this text in a file called `example.m`:

```
function [sum,diff] = example(x,y);  
%EXAMPLE(X,Y) returns the sum of X and Y.  
%[SUM DIFF] = EXAMPLE(X,Y) returns the sum and the difference  
sum = x+y;  
diff = x-y;
```

Try the following:

```
help example  
example(2,3)  
[a b] = example(2,3)  
[a b] = example([10 20],[1 2])
```

6. One useful function is `fzero`, because you can use it to find the numerical inverse of a function with no analytic solution. Use `fzero` to find the value of ν for which $F_{0.25,\nu,\nu} = 2.2$.

7. Plot an operating characteristic chart like this one here:

