

Matlab Session (9/30/2013)

We are solving Exercise 5 in Section 2.5.

(a)

First, create `my_fun.m` which looks like this:

```
function y = my_fun(x)
y = x^3 + x^2 - 3*x - 3;
```

After creating `my_fun` execute the following command:

```
>> secant('my_fun',1,2,1e-15,7)
 2  1.571428571428571
    3  1.705410821643287
    4  1.735135770660739
    5  1.731996370782699
    6  1.732050697785584
    7  1.732050807572790
```

Maximum number of iterations exceeded

(b)

Modify `secant.m` Line 39 (the one starting with “`disp (sprintf`”) to read

```
disp ( sprintf ( '%3d \t %e \t %e \t %e \n', i, ...
    abs(new-old), abs(old-sqrt(3)), abs(new-sqrt(3)) ) )
```

After modifying `secant.m` to output the three numbers in Ex 5b (Sec. 2.5):

```
>> secant('my_fun',1,2,1e-15,7)
 2  4.285714e-001  2.679492e-001  1.606222e-001
```

```

3  1.339823e-001  1.606222e-001  2.663999e-002
4  2.972495e-002  2.663999e-002  3.084963e-003
5  3.139400e-003  3.084963e-003  5.443679e-005
6  5.432700e-005  5.443679e-005  1.097833e-007
7  1.097872e-007  1.097833e-007  3.912870e-012

```

Maximum number of iterations exceeded

(c)

Modify `secant.m` Line 39 once again to read

```
disp ( sprintf ( '%3d \t %e\n', i, abs(new-sqrt(3))/abs(old-sqrt(3))^1.618 ) )
```

After modifying `secant.m` to output the quantity in Ex 5c (Sec. 2.5):

```

>> secant('my_fun',1,2,1e-15,7)
2  1.352748e+000
3  5.135000e-001
4  1.088268e+000
5  6.284721e-001
6  8.706873e-001
7  7.127016e-001

```

Maximum number of iterations exceeded

Newton's method

We also did the Newton's method:

First, modify `my_fun.m` to read:

```

function [y, yp] = my_fun(x)
y = x^3 + x^2 - 3*x - 3;
yp = 3*x^2 + 2*x - 3;

```

Then run

```
>> newton('my_fun',2,1e-10,10)
1  1.7692307692

2  1.7329238104

3  1.7320513061

4  1.7320508076

5  1.7320508076

>>
```