Problem 4

$$f(x) = e^x - x - 1 \quad | \quad f(0) = 0$$
$$f(x) = e^x - 1 \quad | \quad f'(0) = 0$$
$$f''(x) = e^x \quad | \quad f''(0) = 1$$

$$\lim_{n \to \infty} \frac{|p_{n+1} - p|}{|p_n - p|^\alpha} = \lambda,$$

Fig-1: Equation for checking the type of convergency of the roots.

Thus, f(x) has a zero of multiplicity two at x=0.

```
>> [xn, xm, itern, iterm] = T4_20110065(1, 10e-3, 100)

xn =

   7.3080e-09


xm =

  -4.2264e-11


itern =

   28


iterm =

   5
```

Fig-2: Output of the code. n at the end indicates normal newton. Whereas m indicates modified newton method.
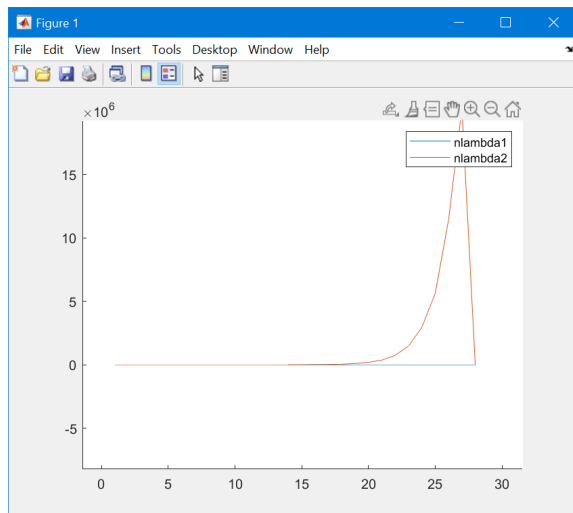
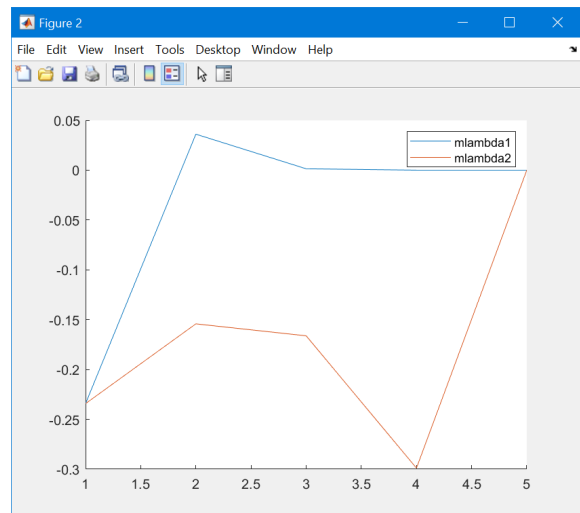Fig-3: The graph of lambda with respect to number of iterations. 1, 2 at the end denote α from figure 1.

Fig-4: The same graph as figure 3 for modified newton method.