Alayerogun Oluwademilade
16/ENG05/010 Mechatronics Engineering
ENG 582 Assignment

Assignment II

$$F(x) = e^{-0.5x}(4-x) - 2 = 4e^{-0.5x} - xe^{-0.5x} - 2$$

$$x = 0.5$$

$$f'(x) = -2e^{-0.5} - e^{-0.5x} + \cancel{0.5x}\, 0.5xe^{-0.5x}$$

$$x_{i+1} = x_i - \frac{f(x_i)}{f'(x_i)}$$

$$x_{i+1} = 0.5 - \frac{\left(4e^{-0.5\times0.5} - 0.5\times e^{(-0.5\times0.5)} - 2\right)}{-2e^{-0.5\times0.5} - e^{(0.5\times0.5)} + 0.5\times0.5e^{-0.5\times0.5}}$$

$$= 0.5 - \frac{0.7258007407}{-2.141702153}$$

$$= 0.838890606.$$

$$x_{i+1} = 0.884956 - \frac{0.001236575}{-1.643060762}$$

$$= 0.885708605.$$

MATLAB PROGRAM CODE

```
commandwindow
clear
clc
syms x
x=0.5;
for i= 1:2000
    iter(i+1)=i;
    f(i)=(exp(-0.5*x(i)))*((4-x(i))-2);
    f1(i)=(-2*exp(-0.5*x(i)))-(exp(-0.5*x(i)))+(0.5*x(i)*exp(-
0.5*x(i)));
    x(i+1)=(x(i))+(f(i))/f1(i);
    Ea(i+1)=abs((x(i+1)-x(i)/x(i+1))*100)
    if Ea(i+1)<=1*exp(-9) , break, end
end
    Tablo=[iter',x',Ea']
```