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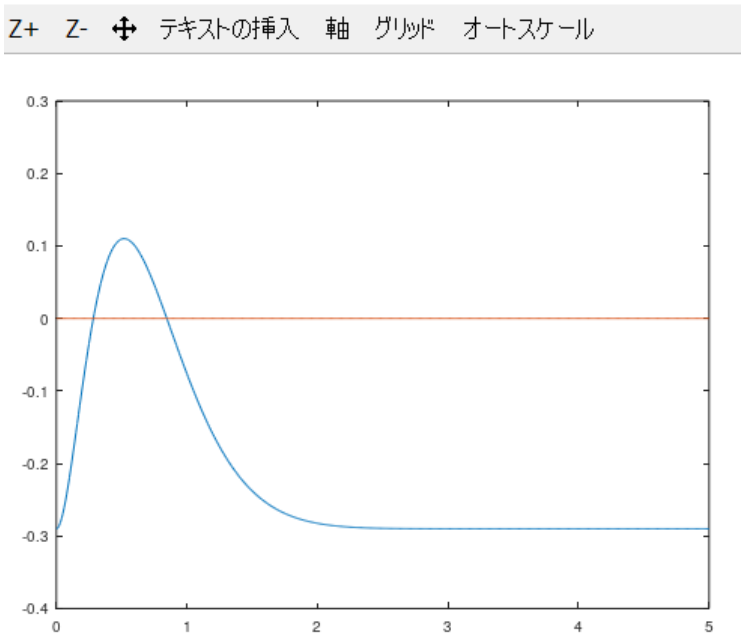
B9TB1710

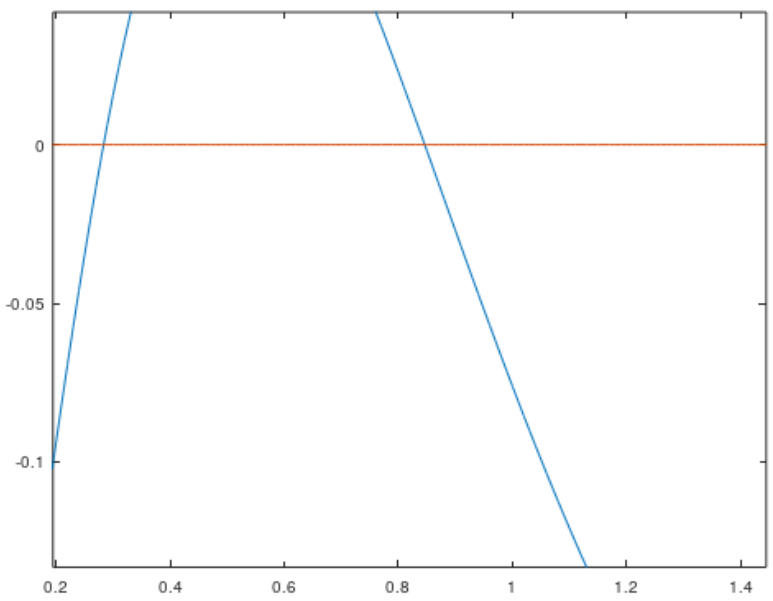
First, I define numbers A,B,C,D according to my Student ID. I determine my domain of x to be $1 \ll x \ll 5$. Then, I create function $y = f(x)$ as given in the assignment. Using command **plot** I make a graph of the function. In order to better see the approximate place of the roots, I also plot the straight line $y = 0$ which is denoted as $y0$ in my code. Therefore my command **plot** has 4 arguments: x, y being the domain and values of the function $f(x)$, and $x, y0$ standing for the line y=0.

CAPS_04_B9TB1710_assn3.m

```
A=1;
B=7;
C=1;
D=0;

#range of x:
x=0:0.01:5;

#my function y=f(x)
y=10*sin(A*x).^2.*exp(-B*x/2) + 0.01*(C+D)-0.3;
y0=zeros(1,length(x));
plot(x,y,x,y0)

fsolve(@(x)10*sin(A*x).^2.*exp(-B*x/2) + 0.01*(C+D)-0.3,0)
fsolve(@(x)10*sin(A*x).^2.*exp(-B*x/2) + 0.01*(C+D)-0.3,0.5)
```

After running the program, I get the graph on the right as an output. In order to better see the roots I zoom it as below.





Now I can see that my first root is somewhere after 0.2, and the second root is somewhere after 0.8. These will be my initial values in the function **fsolve**.

I call the function **fsolve** to get the accurate values of the roots. My output is:

```
>> CAPS_04_B9TB1710_assn3

ans =  0.84626
ans =  0.28342
>>
```

Therefore values of the roots are $x = 0.28342$ and $x = 0.84626$.