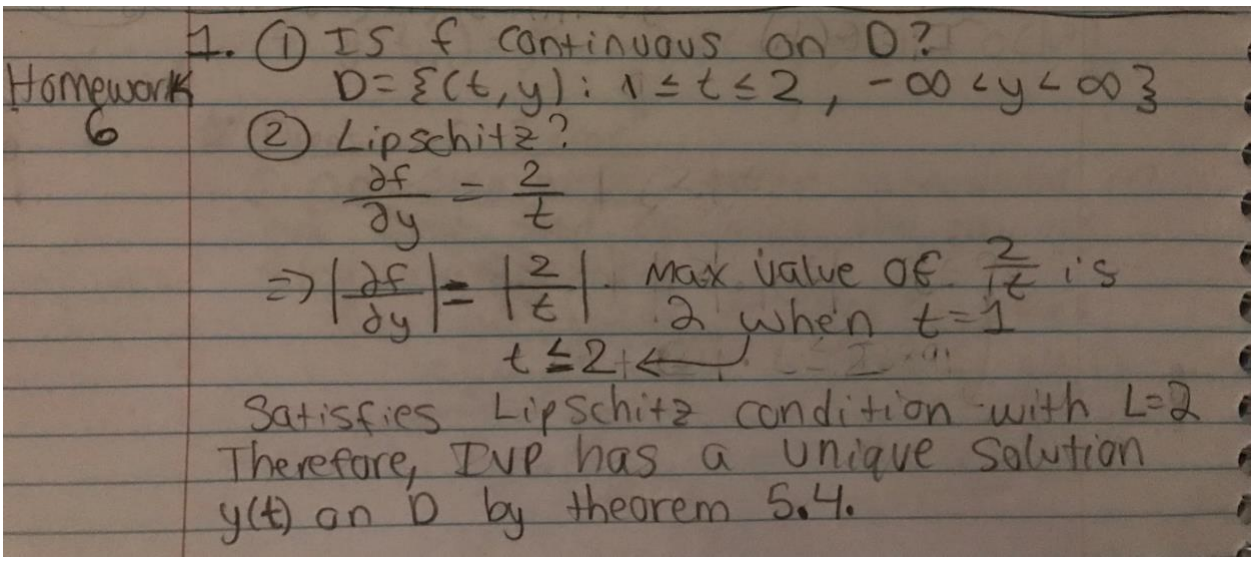
1.



2a. `function [t,w]=eulers(a, b, alpha, f, h)`

```
% MA 3457 / CS 4033 (B-Term 2018)
% Student: Vandana Anand
% Homework 6
% Problem 2A
%
% Function to
%
%
% Input: a - the lower bound of t
%        b - the upper bound of t
%        alpha - y(a)
%        f - the function to be evaluated
%        h - the step sizes
%
% Output: a vector of t points and weights
%

N=(b-a)/h; %find N by rearranging the h formula
t(1)=a; %setting t intial to a
w(1)=alpha; %setting initial weight to alpha

for i=1:N %iterate from 1 to N
    w(i+1)=w(i)+h*f(t(i),w(i)); %weight formula
    t(i+1)=a+i*h; %t formula
end %end loop

end %end function
```

2b. h=0.5

t1 =

0 0.500000000000000 1.000000000000000

w1 =

1 2 2

h=0.25

t2 =

Columns 1 through 4

0 0.250000000000000 0.500000000000000 0.750000000000000

Column 5

1.000000000000000

w2 =

Columns 1 through 4

1.000000000000000 1.500000000000000 1.794117647058824 1.835294117647059

Column 5

1.714823529411765

h=0.1

t3 =

Columns 1 through 4

0 0.100000000000000 0.200000000000000 0.300000000000000

Columns 5 through 8

0.400000000000000 0.500000000000000 0.600000000000000 0.700000000000000

Columns 9 through 11

0.800000000000000 0.900000000000000 1.000000000000000

w3 =

Columns 1 through 4

1.000000000000000 1.200000000000000 1.374257425742574 1.513709063214014

Columns 5 through 8

1.613871867073793 1.674984152103186 1.700985419934931 1.697957294646555

Columns 9 through 11

1.672645870988489 1.631412127477417 1.579669484965851

2c. h values

h1 @ 0.5=

1.000000000000000 1.600000000000000 1.500000000000000

h2 @ 0.25=

Columns 1 through 4

1.000000000000000 1.411764705882353 1.600000000000000 1.600000000000000

Column 5

1.500000000000000

h3 @ 0.1=

Columns 1 through 4

1.000000000000000 1.188118811881188 1.346153846153846 1.467889908256881

Columns 5 through 8

1.551724137931034 1.600000000000000 1.617647058823529 1.610738255033557

Columns 9 through 11

1.585365853658536 1.546961325966851 1.500000000000000

Absolute error values

abserror1 =

0 0.400000000000000 0.500000000000000

abserror2 =

Columns 1 through 4

0 0.088235294117647 0.194117647058824 0.235294117647059

Column 5

0.214823529411765

abserror3 =

Columns 1 through 4

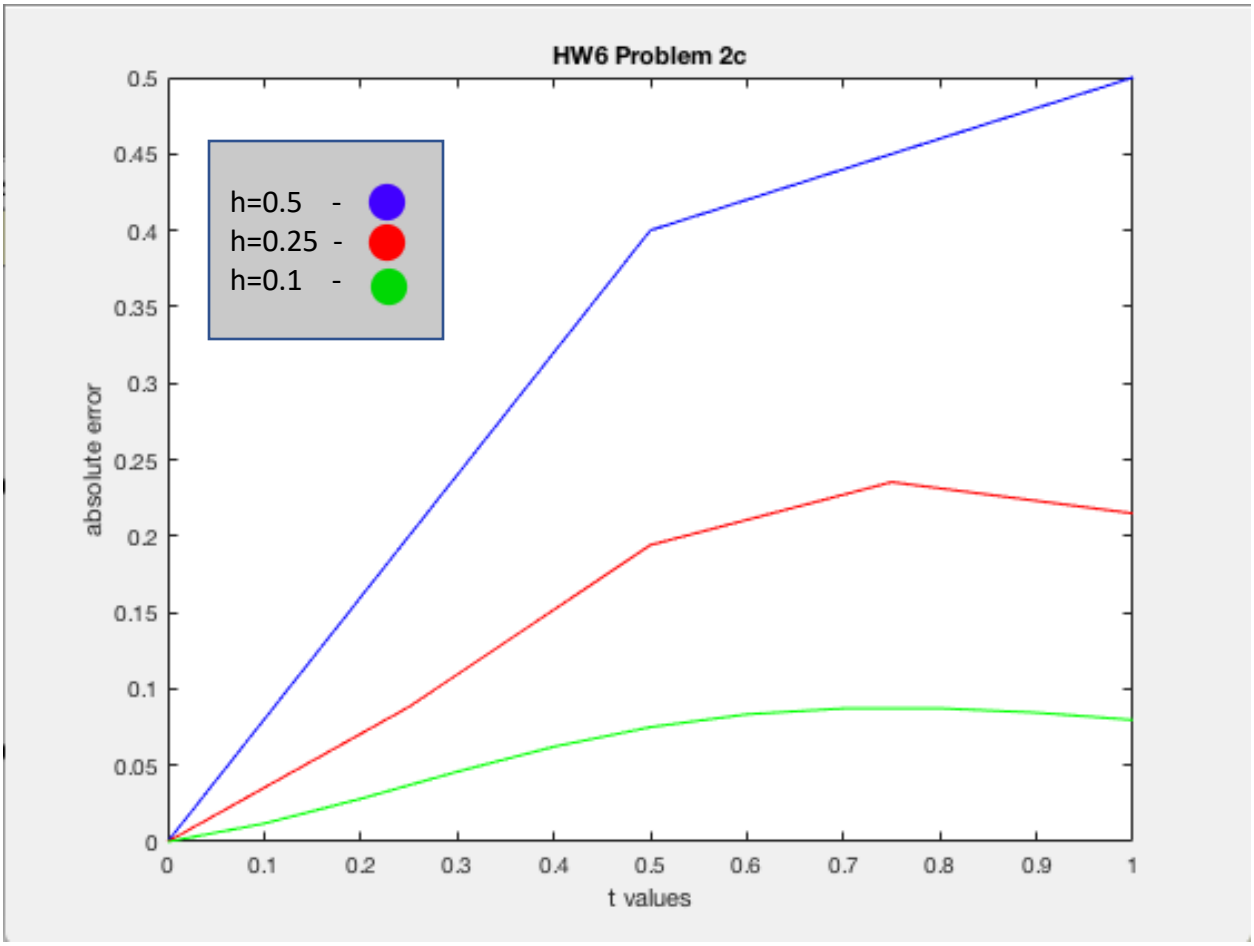
0 0.011881188118812 0.028103579588728 0.045819154957133

Columns 5 through 8

0.062147729142758 0.074984152103186 0.083338361111402 0.087219039612998

Columns 9 through 11

0.087280017329953 0.084450801510567 0.079669484965851



The absolute error data points at h=0.5 seem to increase. However, when looking at lower h values such as h=0.25 and h=0.5, the data values increase and then start to decrease. This is also apparent on the graph. The blue h=0.5 graph seems to increase. It becomes more apparent that the lines are decreasing as h becomes smaller. The is probably the result of the error.