Computational and Numerical methods Lab Assignment

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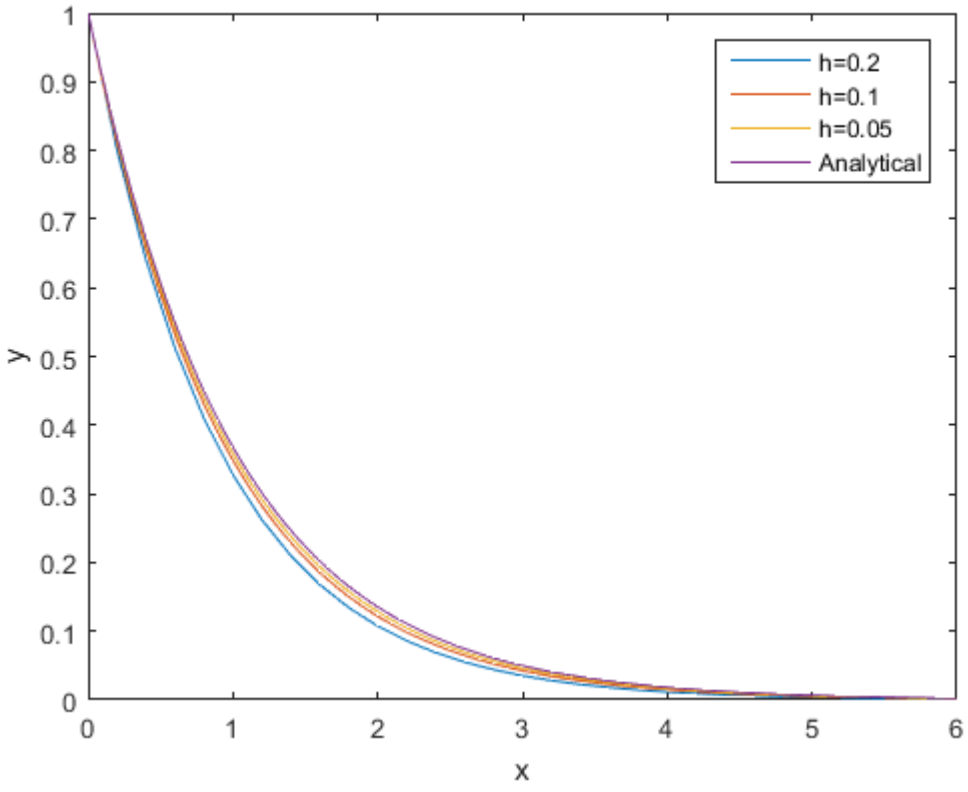
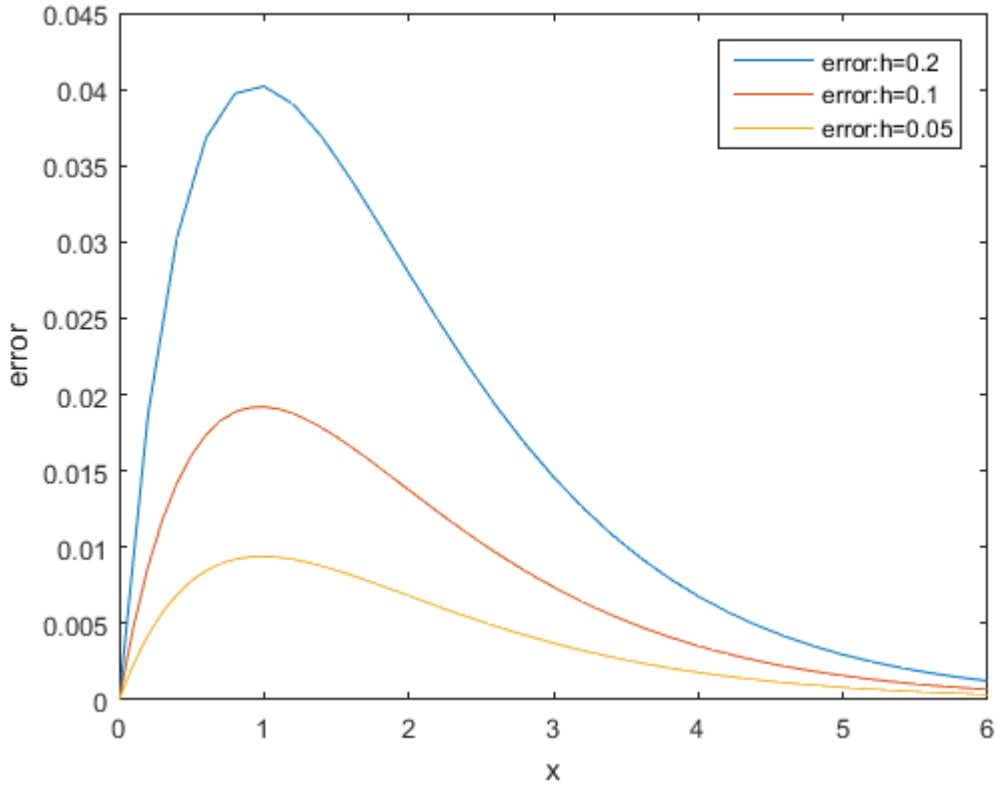
1 Euler's Method to Solve Ordinary Differential Equations

1.1 $Y'(x) = -Y(x), Y(0) = 1$

- Plot of output

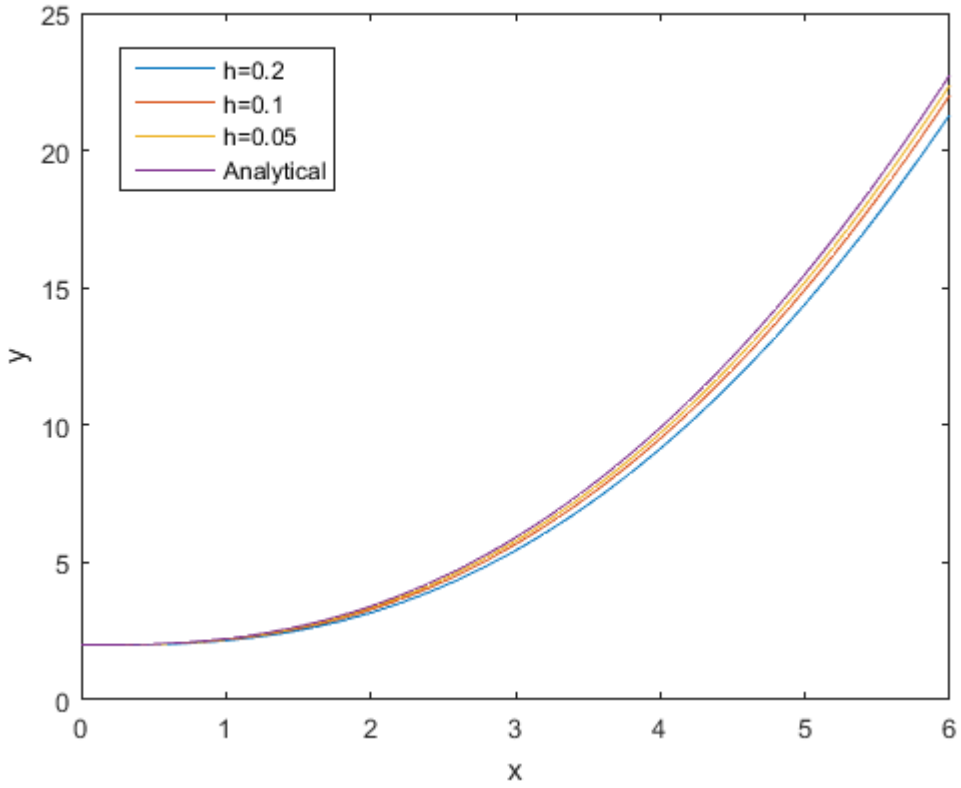


- Plot of error

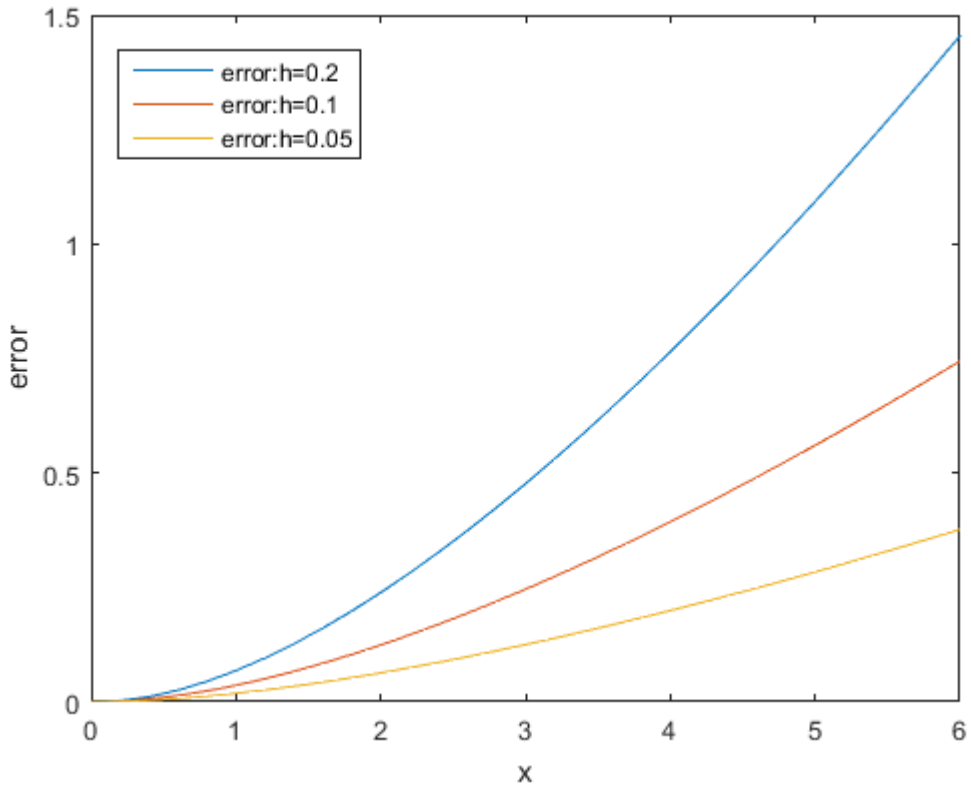


1.2 $Y'(x) = [Y(x) + x^2 - 2]/(x + 1), Y(0) = 2$

- Plot of output



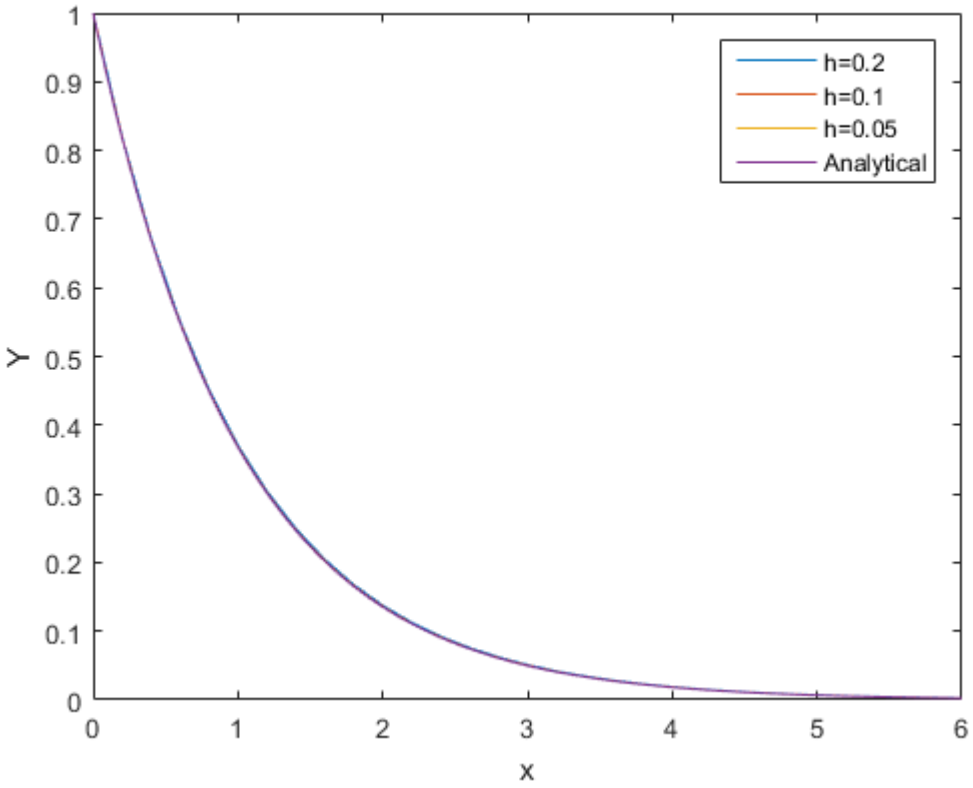
- Plot of error



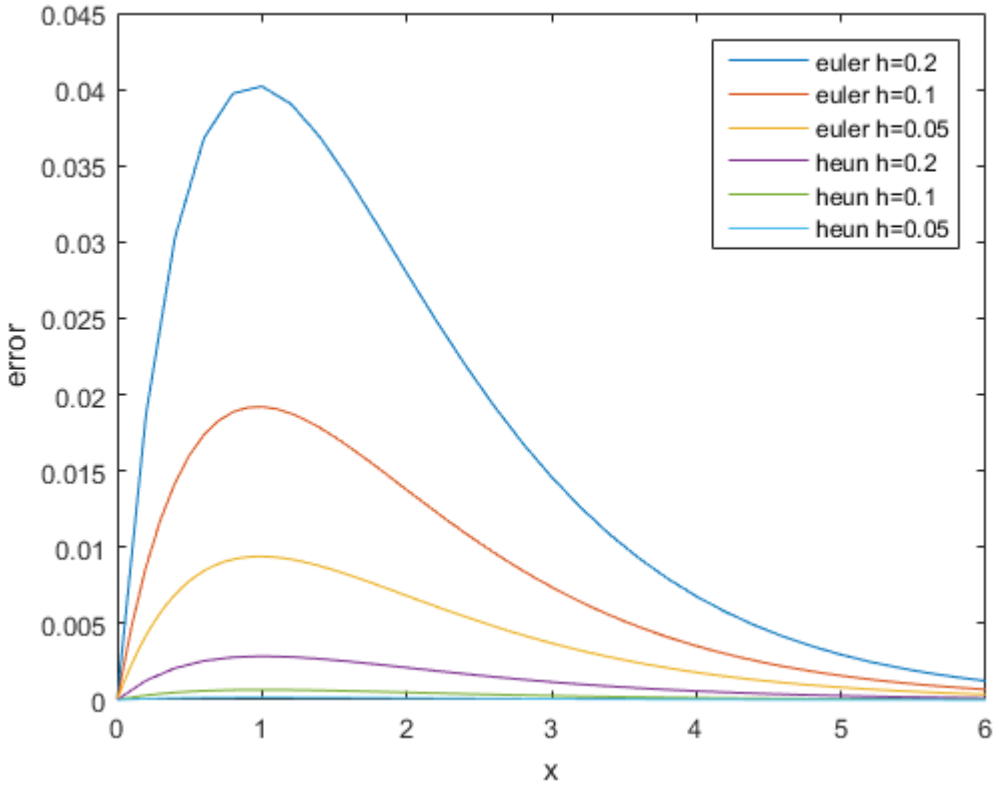
2 The Trapezoidal Method to Solve Ordinary Differential Equations

2.1 $Y'(x) = -Y(x), Y(0) = 1$

- Plot of output

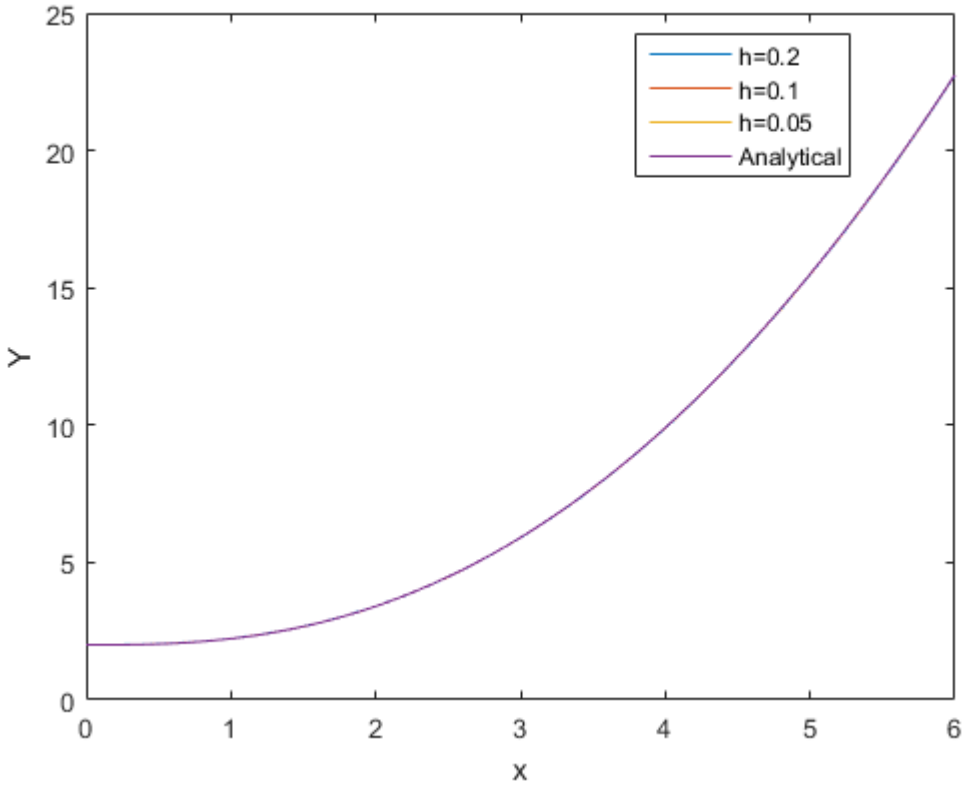


- Plot of error

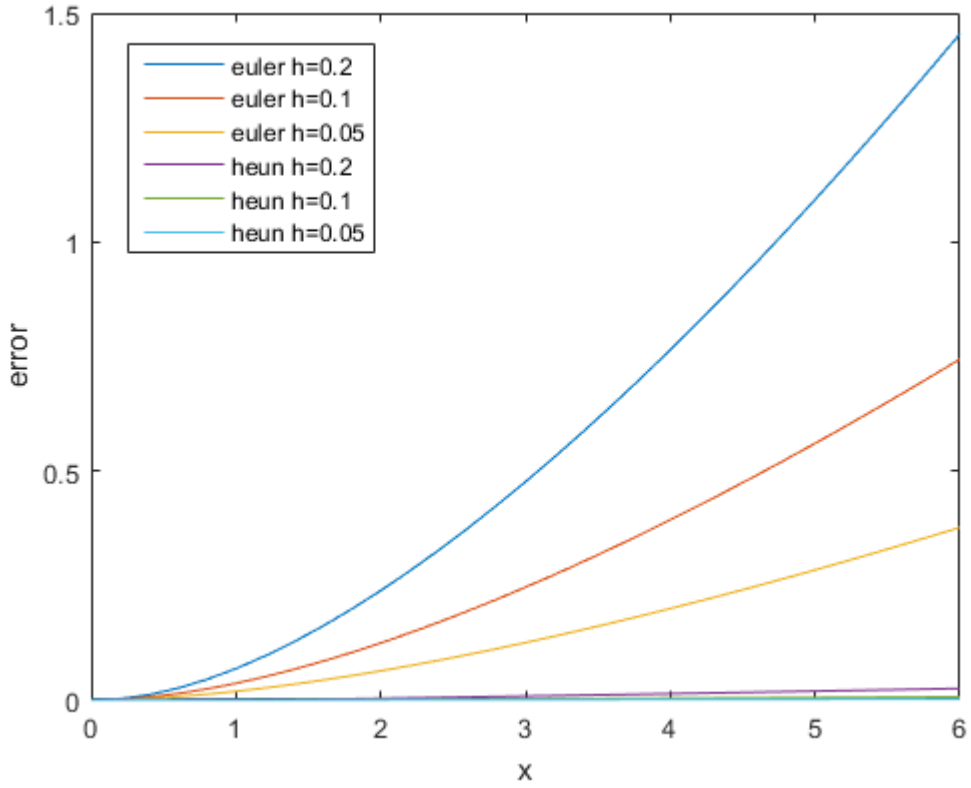


2.2 $Y'(x) = [Y(x) + x^2 - 2]/(x + 1), Y(0) = 2$

- Plot of output



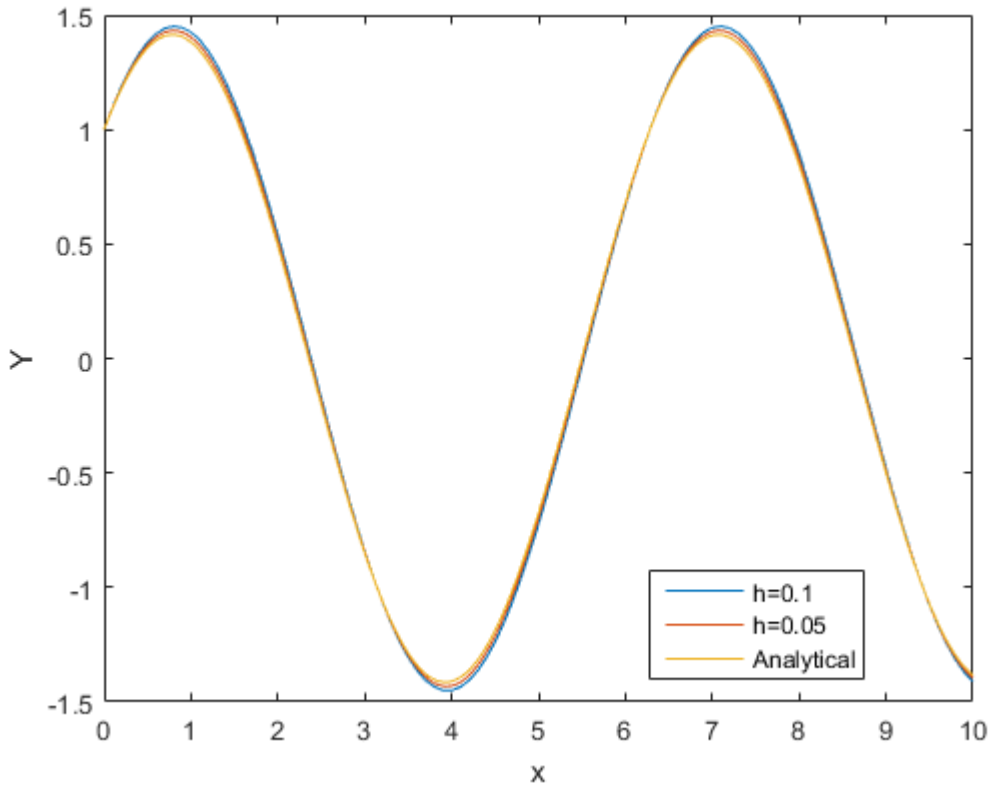
- Plot of error



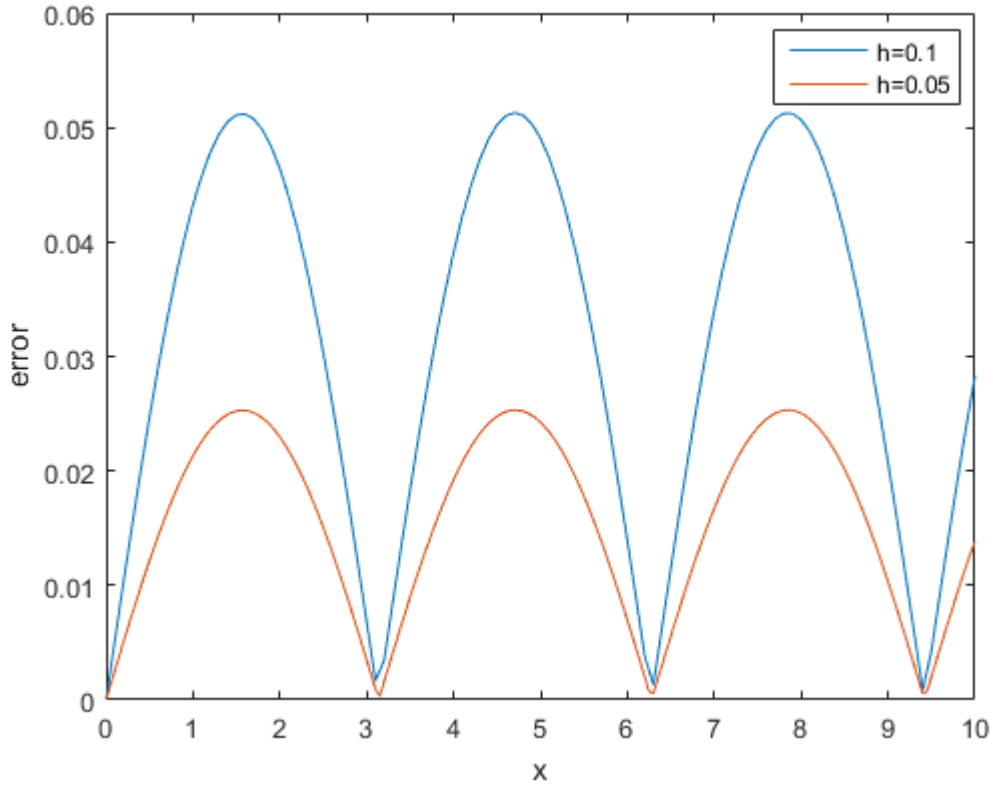
3 Taylor's Method to Solve Ordinary Differential Equations

3.1 first order

- Plot of output

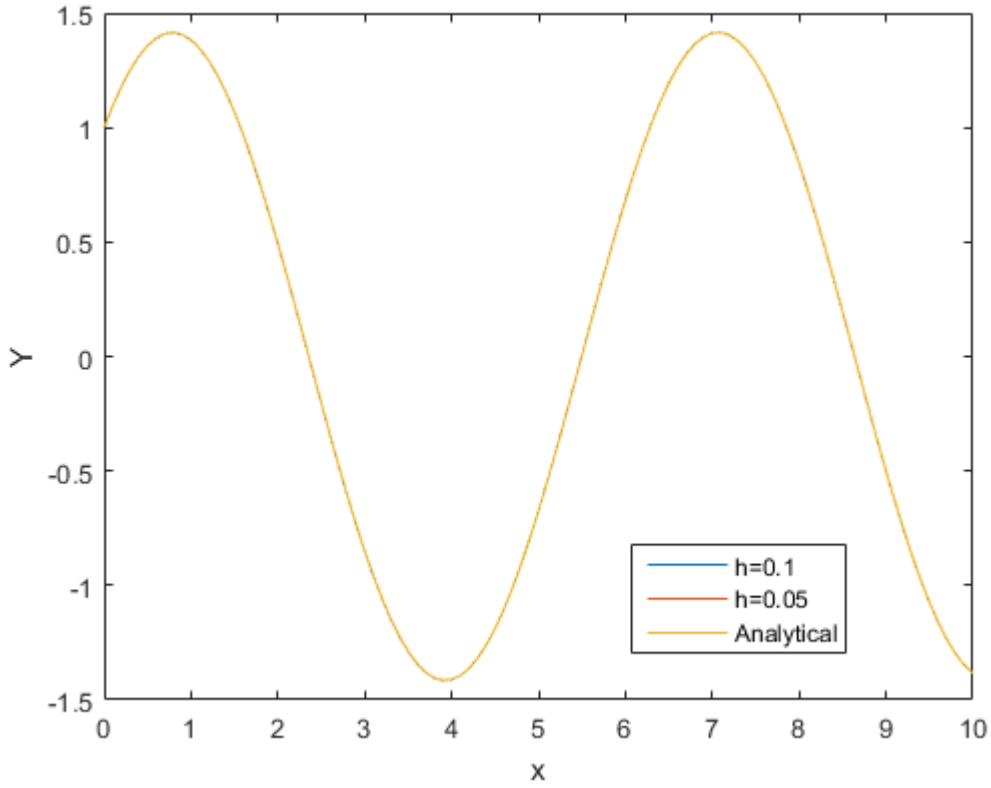


- Plot of error

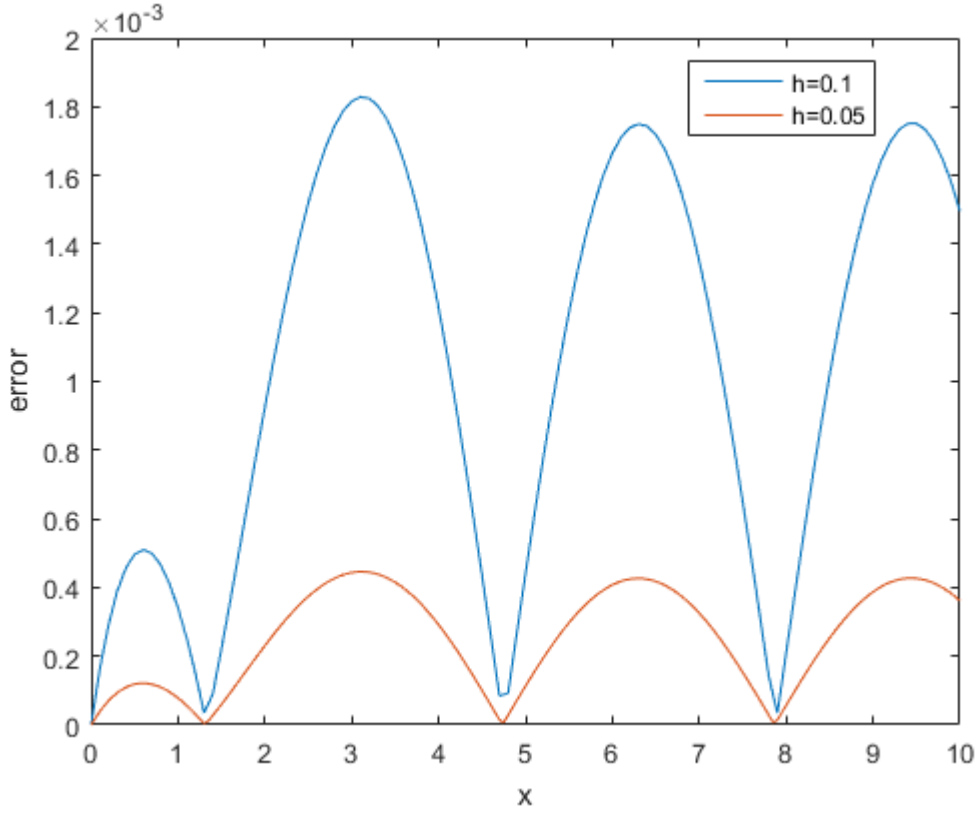


3.2 second order

- Plot of output



- Plot of error


×10^-3
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
error
0
1
2
3
4
5
6
7
8
9
10
x
h=0.1
h=0.05