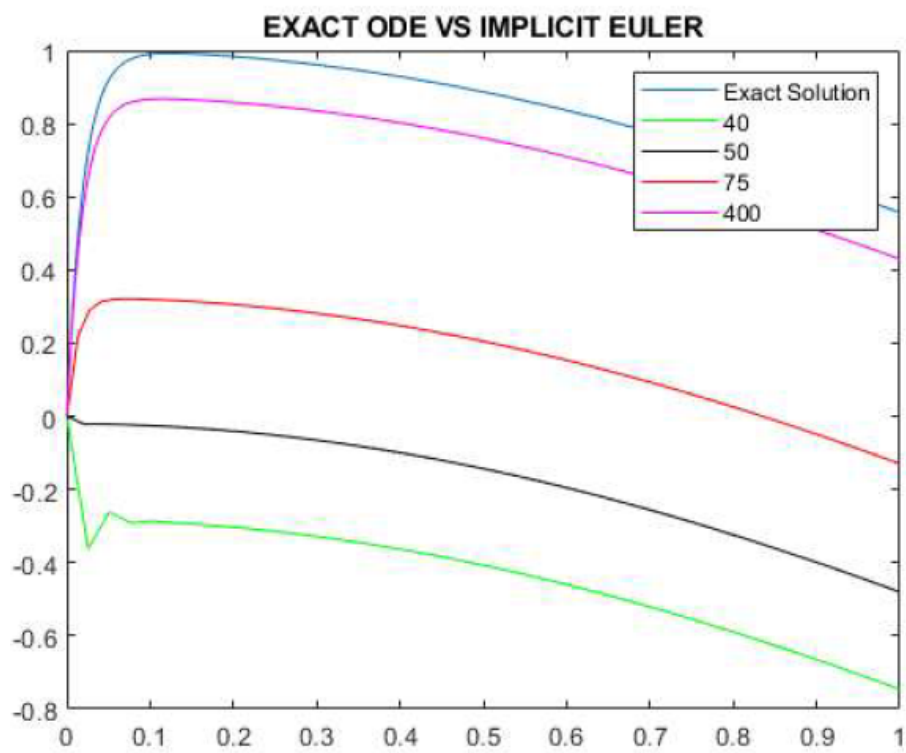
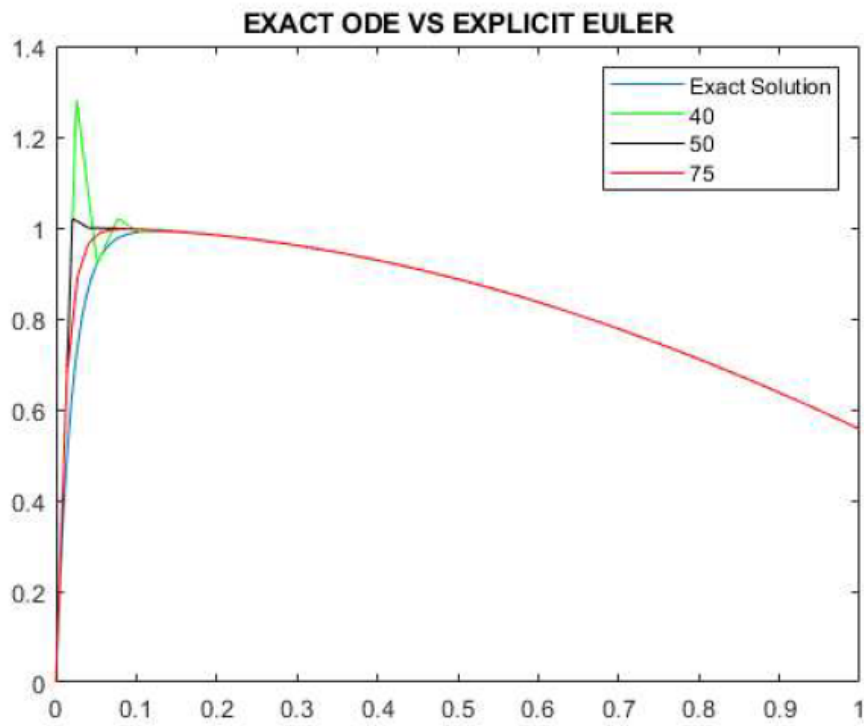
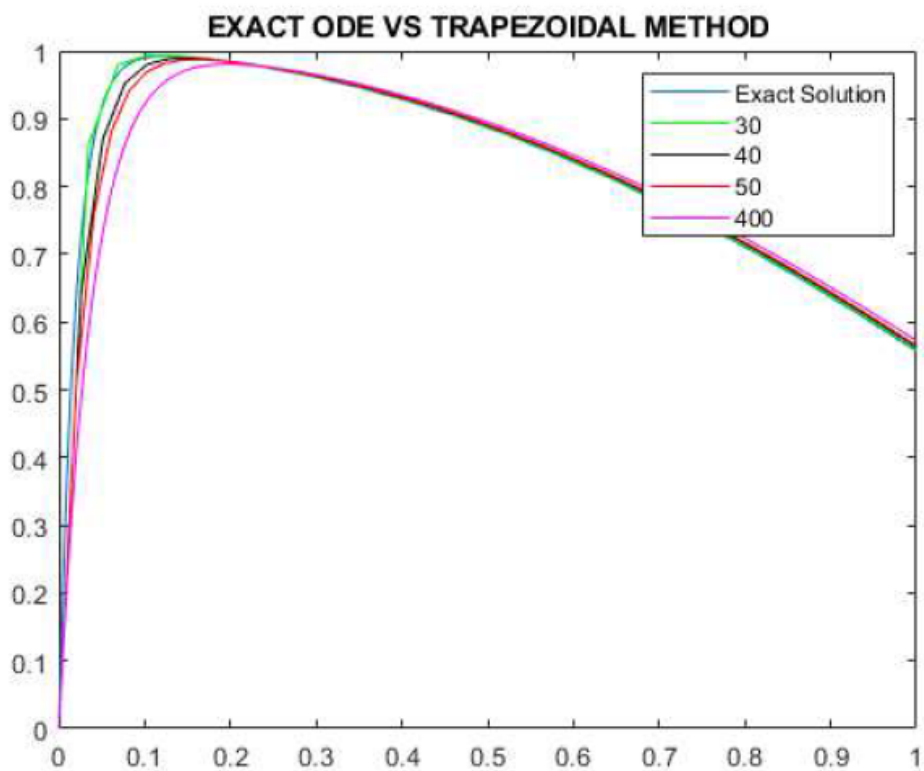
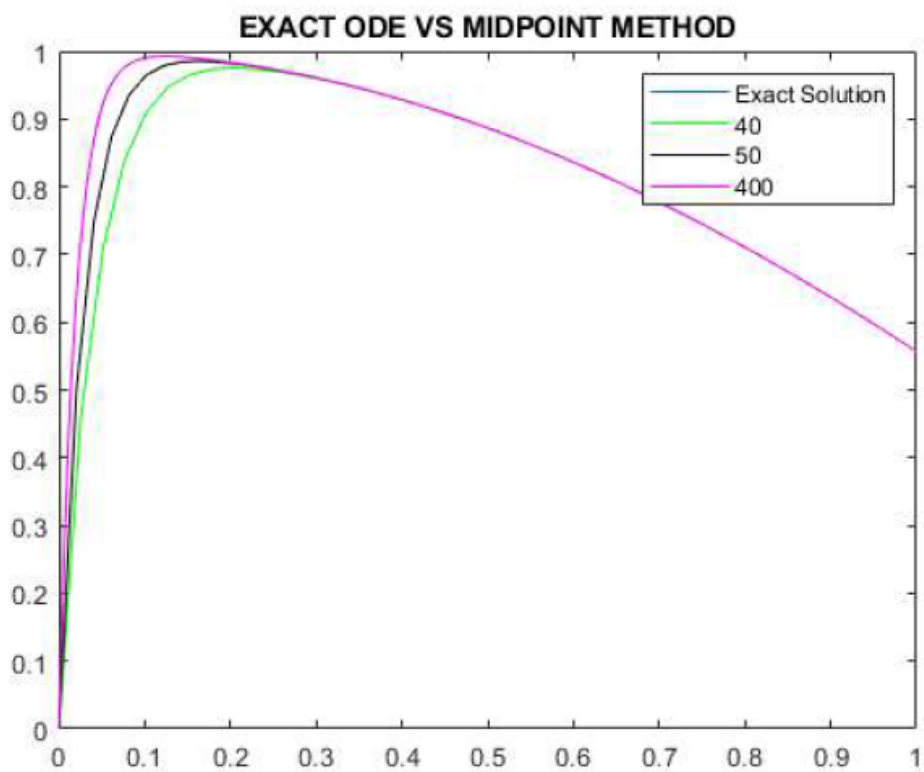
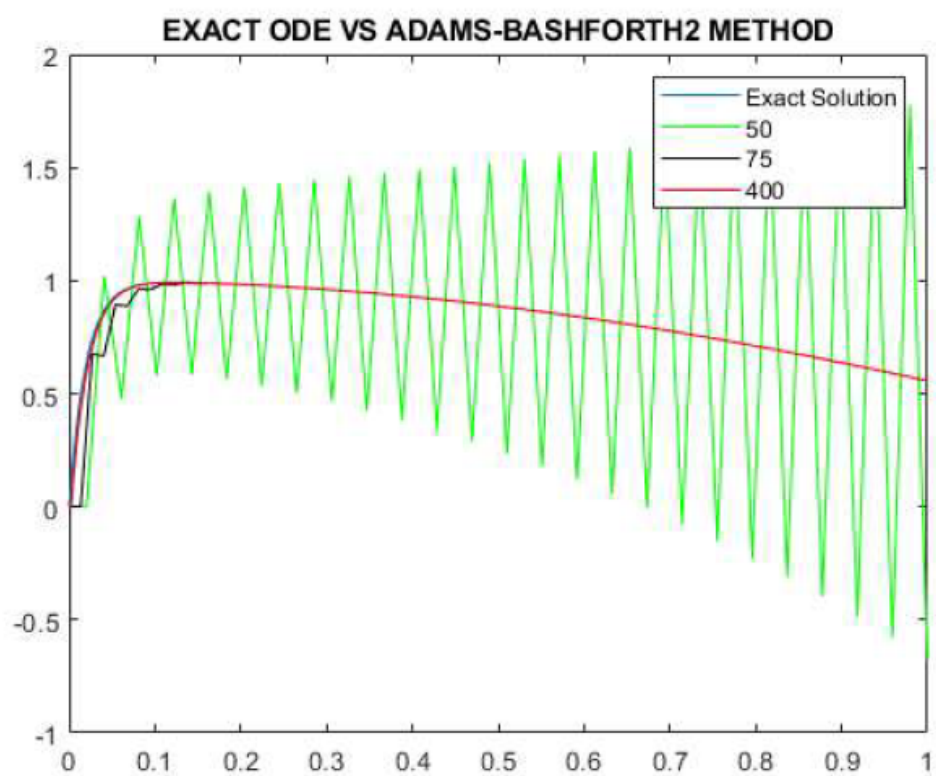
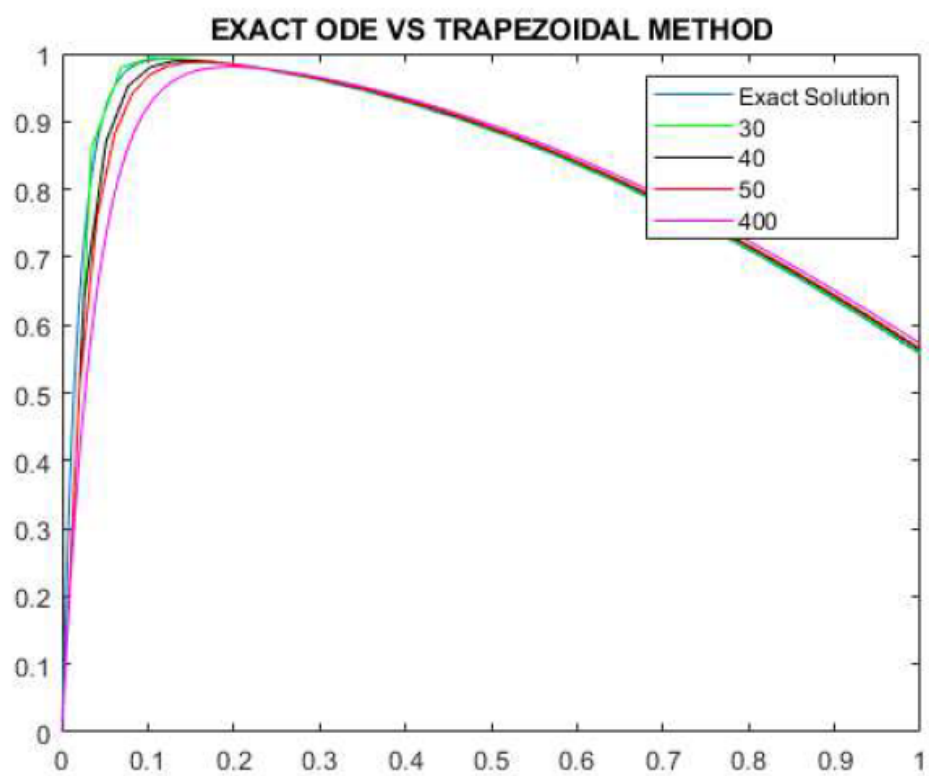


CFD Homework 2

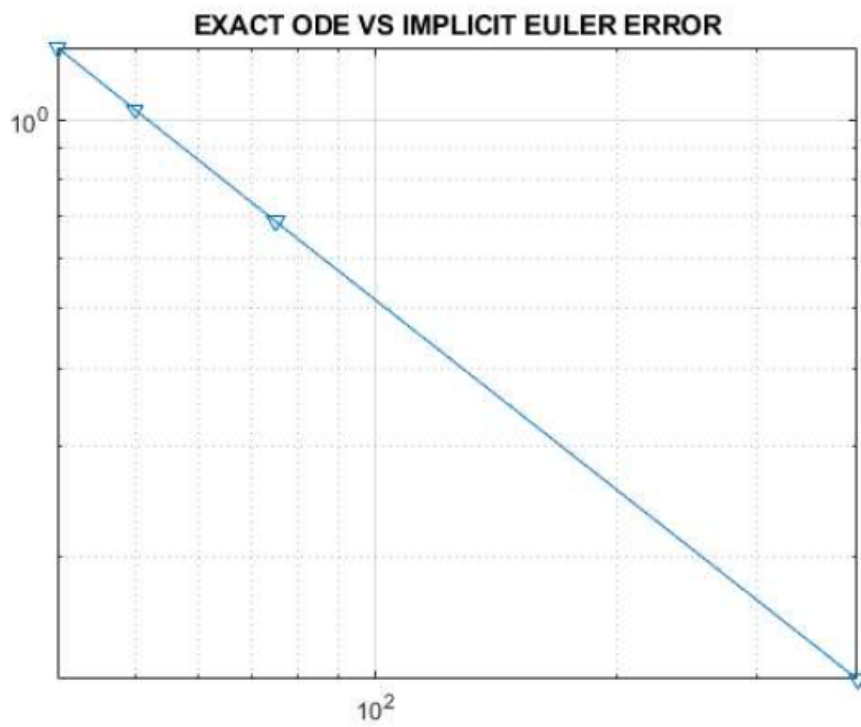
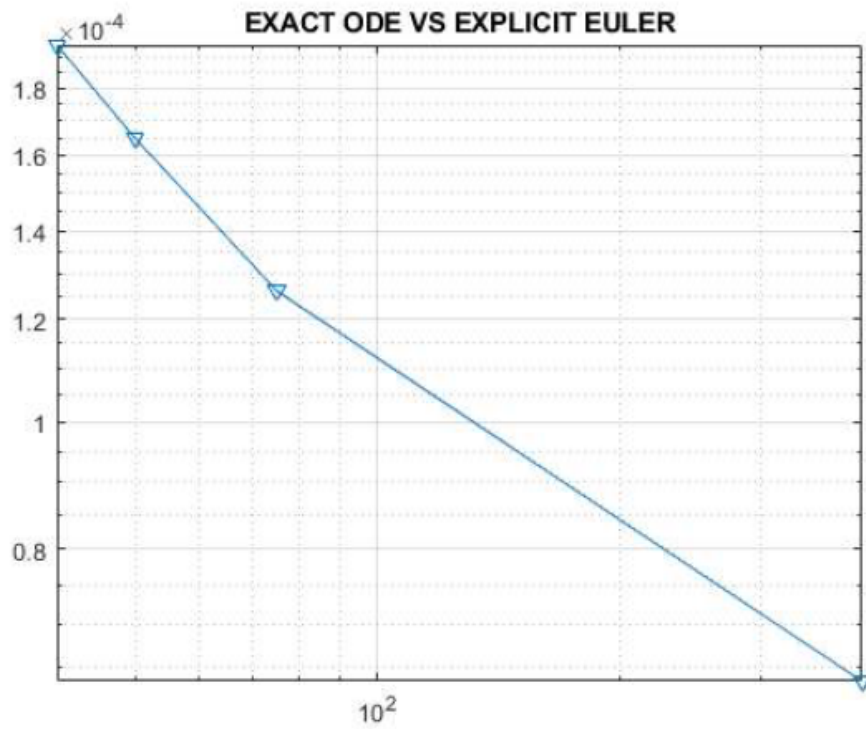
Q1 Part 1:

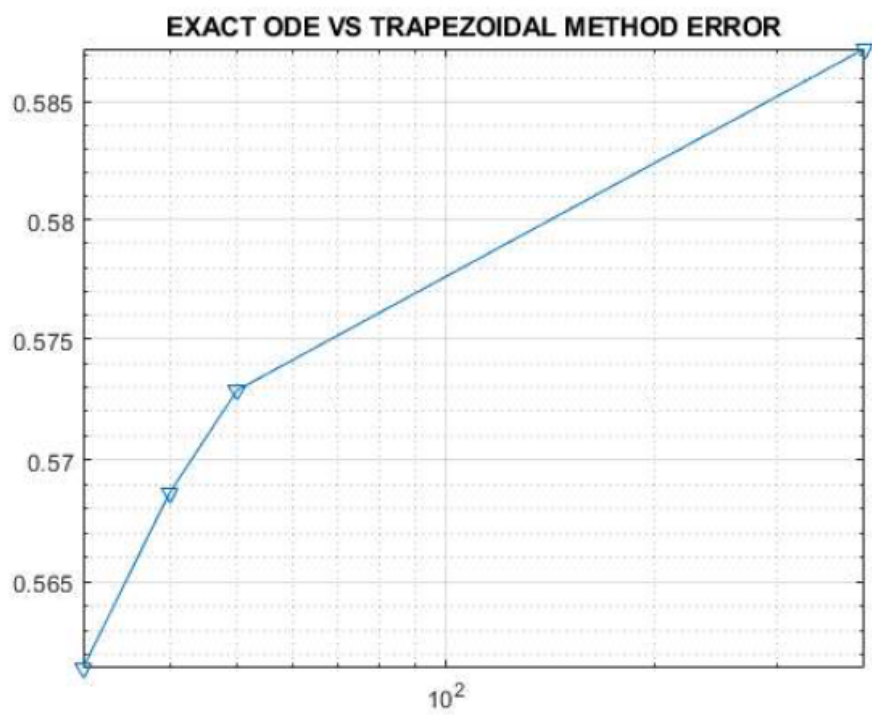
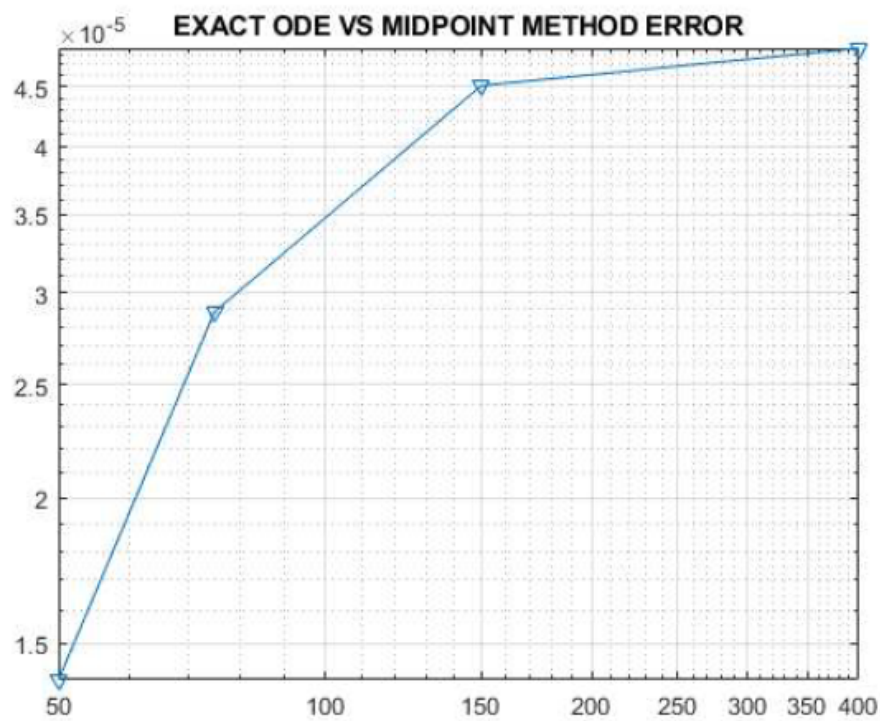


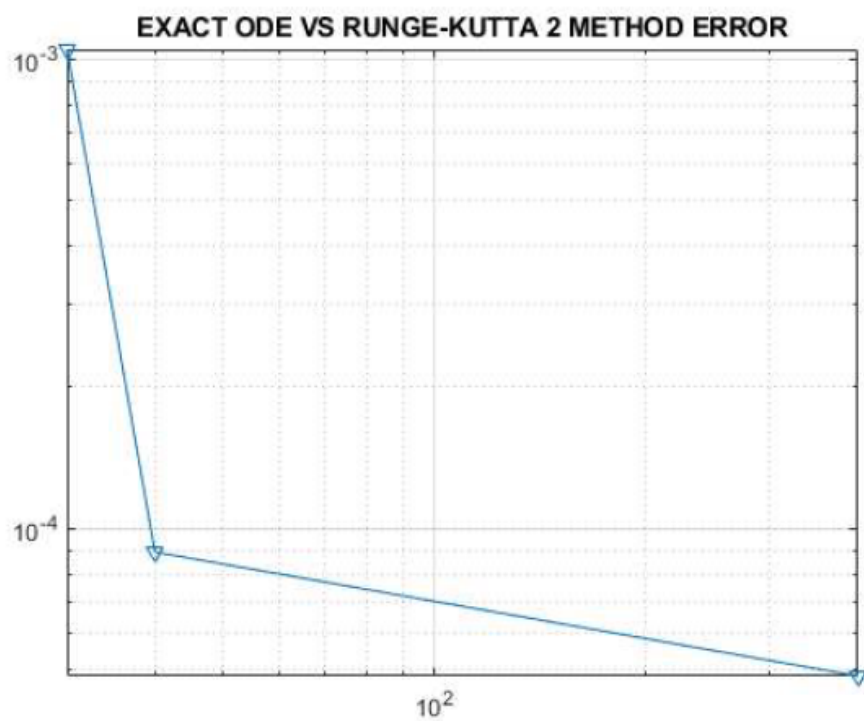
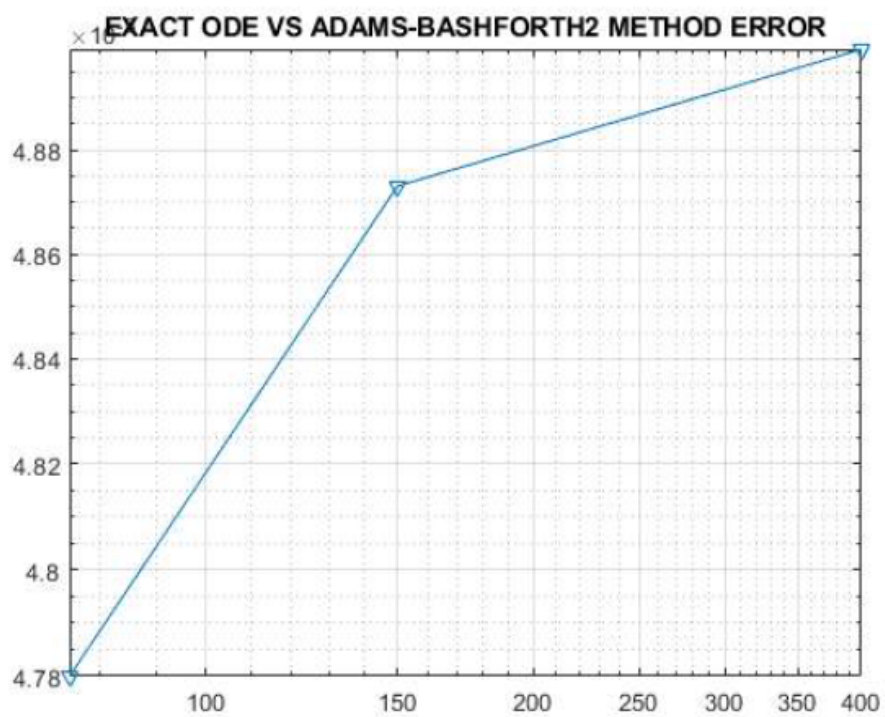




Q1 Part 2:







Q1 Part 3

For the Explicit Euler Method: Alpha = -0.7989

For the Implicit Euler Method: Alpha = -1.029

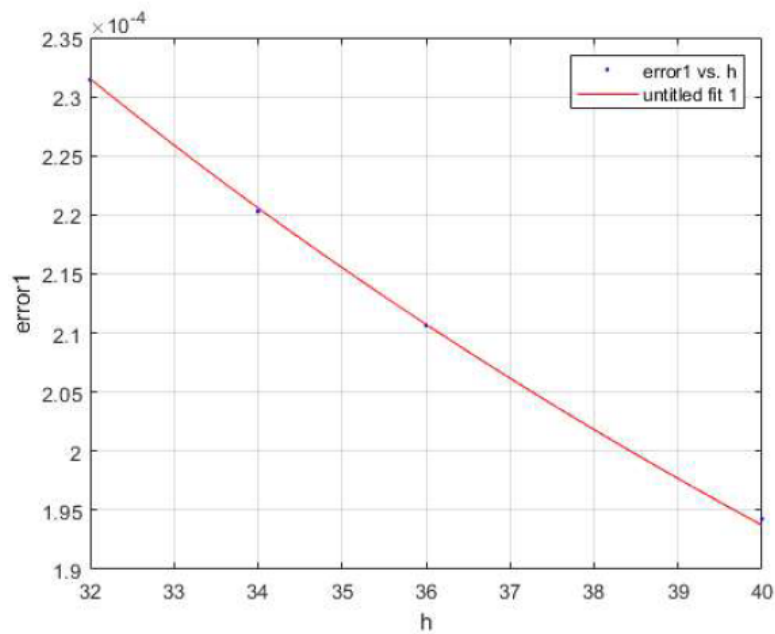
For Midpoint: ALPHA = -7.047

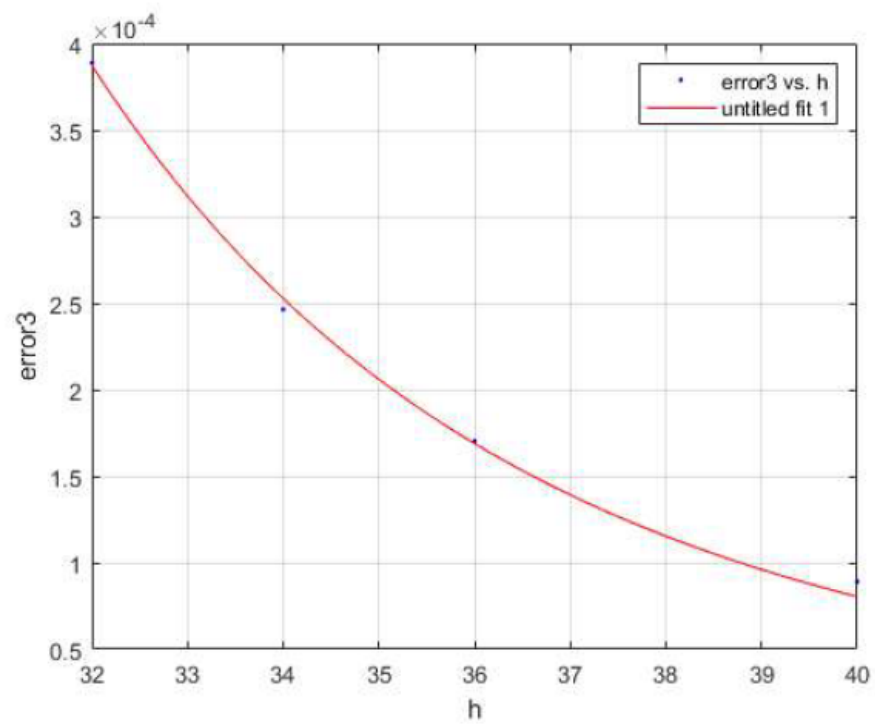
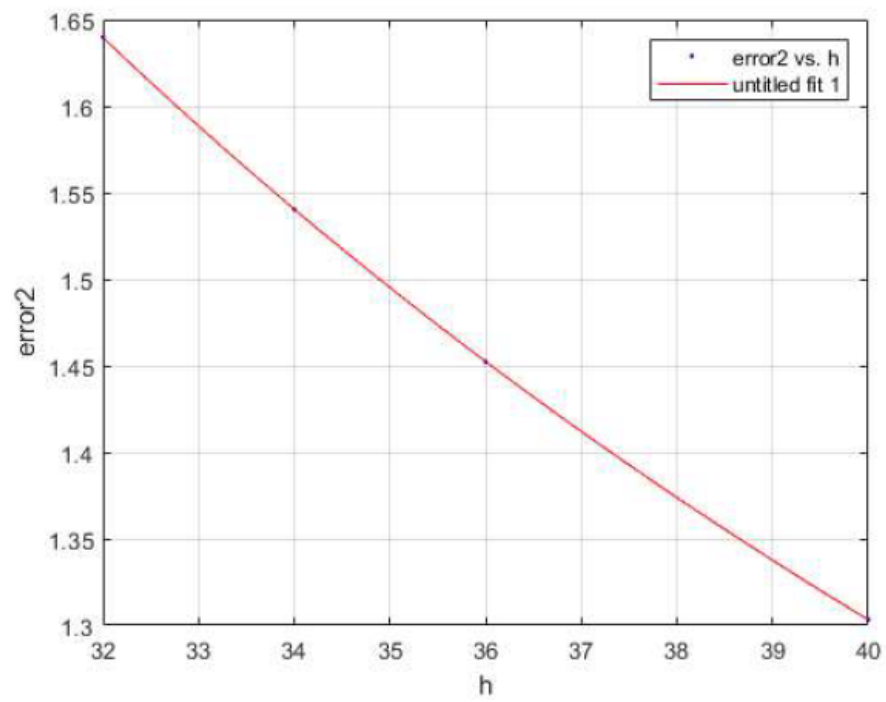
Trapezoid Method: ALPHA = 0.04238

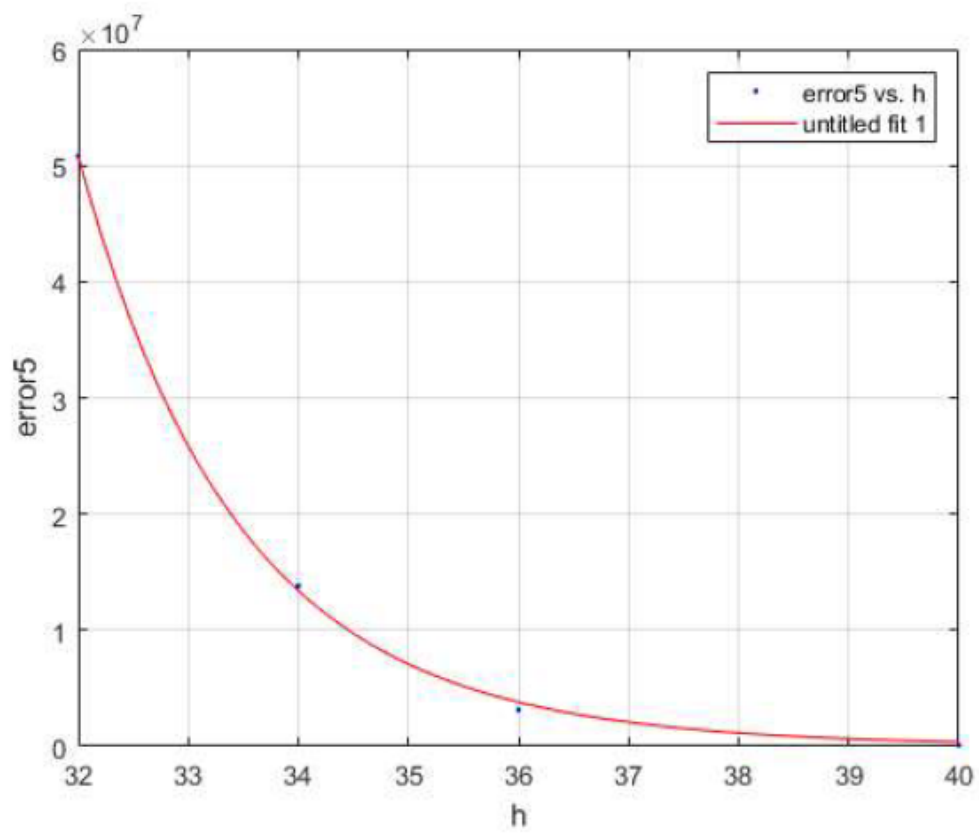
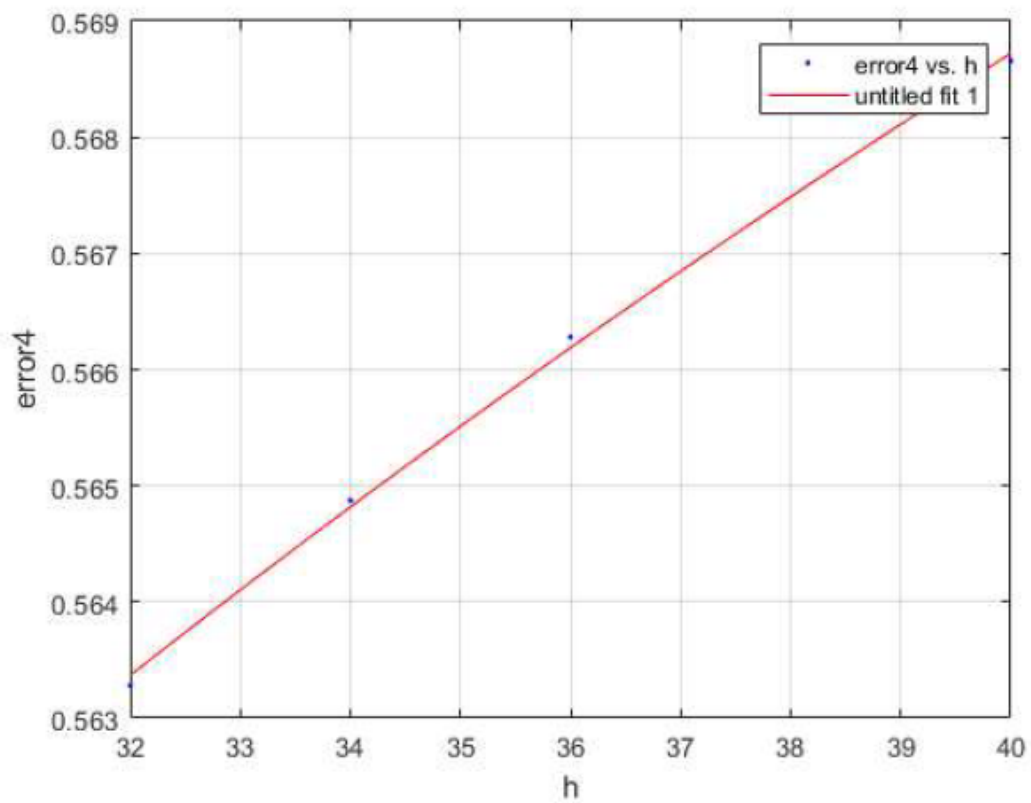
AdamsB2 Method: ALPHA = 21.99

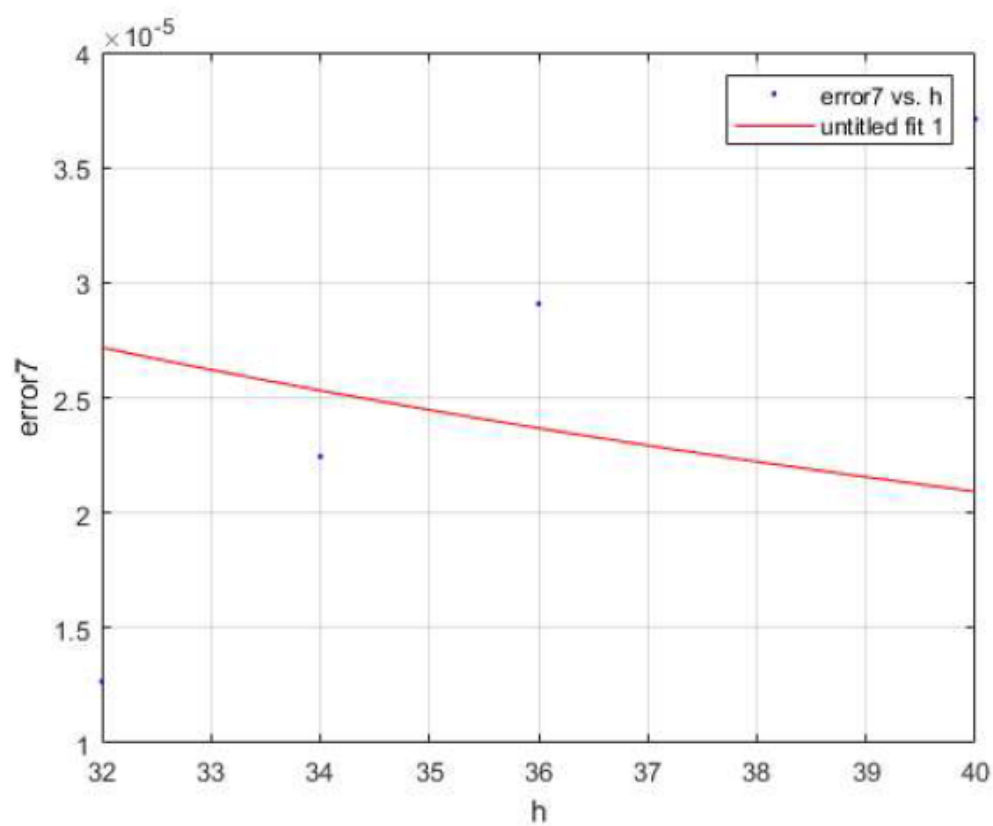
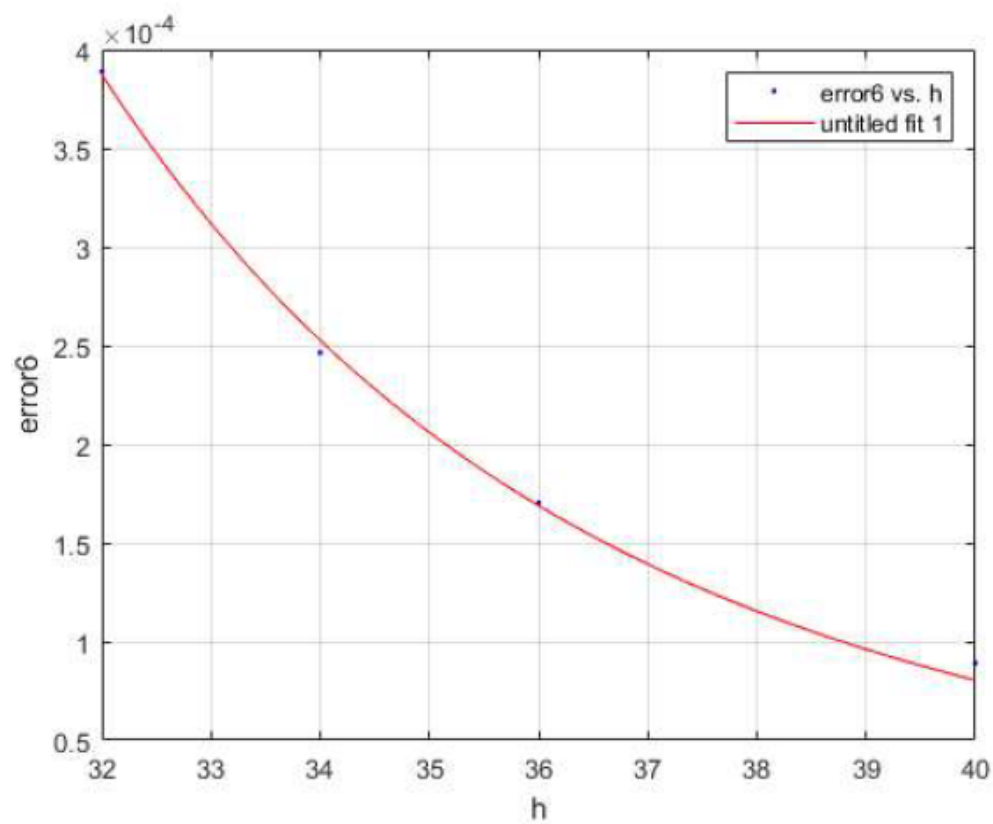
RK2 Method: ALPHA = -7.047

RK4 Method: Alpha = -1.172

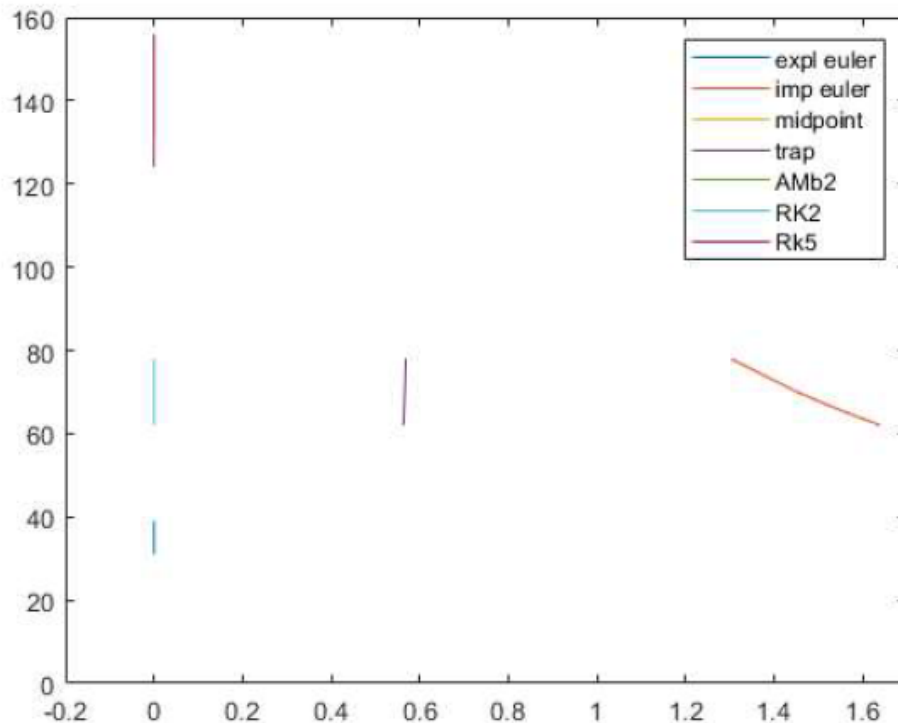








Q1 Part 4



This graph conveys the idea that the higher the h , the faster the the graph converges onto the exact solution. This shows that even though the solution requires a lot more work to be done for a calculation, in the end it is worth it because of how much faster it finishes. It also visualizes how much faster the more advanced methods like RK4 are than Explicit Euler.

WORK FOR DIFFERENT H (size num) :

For size of num 30

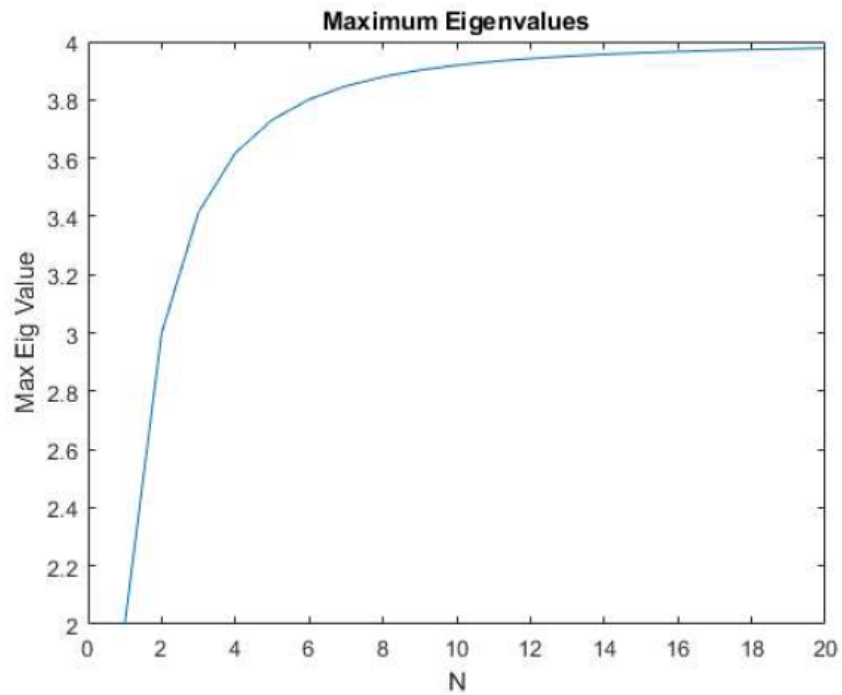
- Work with Explicit Euler 29
- Work with Implicit Euler 29
- Work with Midpoint 29
- Work with Trapezoid Euler 29
- Work with Adams Bashforth Method 29
- Work with RK2 29
- Work with RK5 29

For size of num 32

- Work with Explicit Euler 62
- Work with Implicit Euler 62

Work with Midpoint	62
Work with Trapezoid Euler	62
Work with Adams Bashforth Method	62
Work with RK2	62
Work with RK5	62
For size of num	34
Work with Explicit Euler	66
Work with Implicit Euler	66
Work with Midpoint	66
Work with Trapezoid Euler	66
Work with Adams Bashforth Method	66
Work with RK2	66
Work with RK5	66
For size of num	36
Work with Explicit Euler	70
Work with Implicit Euler	70
Work with Midpoint	70
Work with Trapezoid Euler	70
Work with Adams Bashforth Method	70
Work with RK2	70
Work with RK5	70

Question 2



The amount of Eigen Values is linear to the amount of N the function has, making this plot. This graph shows that how the eigenvalues approach 4 as N goes to infinity.