Numerical Analysis - Homework 20

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Homework Problems
Write code for the backward Euler method.

- Do problems 8.3 problem 6 and 8.4 problems 3, 5, and 7 (you are not expected to implement trapezoid - but understanding and implementing this method would certainly be above and beyond)
- Redo problem 8.2 number 1a using the Backward Euler Method. Compare your results to what you found in the last homework. Does the Backward Euler method do a better job? Discuss the error and convergence of the method.

Ideas for exploration:

- Many of the homework problems for Numerical ODE require some exploration. Changing values, looking at errors, considering convergence (ratio of errors or ratio of solutions!), etc. Sometimes it helps to look at tables of values, other times graphing multiple runs will really help you see what is happening in the method. Keep the ideas of existence, uniqueness, and stability in mind. For example, if you get weird results your first questions should be: is the ode stable, method stable, do solns exist for all x, etc.

You should attempt all these problems before class, but we will work on them in class with our groups.