Numerical Analysis - Homework 18

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Homework Problems

- For each of the ODEs in Chapter 8.1 problem 1 on the book (a,b,c,and d) do the following:
  - Show that the given function satisfies the differential equation. (plug it in!)
  - Determine the value of c that would satisfy the given initial condition.
  - Identify $f(x, y)$ and apply the existence and uniqueness test. Discuss any x_0 or y_0 values of concern.
  - Use the code to draw a direction field and see if you can sketch the solution starting from the given initial condition (either write on a printed version or just outline an imaginary sketch by moving your mouse over the graph). Then plot the real solution and see how well you did.
  - Check the stability or conditioning of each of the problems. You have the solution so you can literally check y_0 vs $y_0 + \epsilon$ for the initial condition.
  - Compare your stability check above to the shortcut method.

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