Comments on Maple Problem Set C

Plotting

- To plot an *expression*, e.g., x^2, the syntax is:

  plot(x^2,x=-1..1).

- To plot a *function*, e.g., f, where f has been defined by the Maple command

  f := x → x^2,

  the syntax is:

  plot(f,-1..1).

  Note that the syntax is different for functions and expressions.

- If the graph doesn't go far enough, you might need to increase the value of **maxfun.**

- To display several plots together, assign a name to each plot. (End each plot command which does that with : instead of ; unless you want to see all the points Maple computed on the plot.) Then give the command:

  with(plots):

  Finally, if for example, you want to display two plots named plot1 and plot2 together, give the command:

  display({plot1,plot2})

Problem 1

- Be sure to get explicit formulas for ϕ_0 and ϕ_1 to find out where they "blow up."

- Get as accurate an estimate as you can for x_* by adjusting the interval on which you plot the solution.

Problem 8

- (e) You can get the location of the maximum and the maximum value either from the plot or by using calculus techniques.
- (f) Be sure to explain how the plots illustrate you conclusions about stability and instability.
  - Be sure that the plots are consistent with your conclusions.

Problem 11

- Read and follow the directions for Problem 10. On each part, make sure you plot on an appropriate interval to get a good idea of the behavior of the solution as x increases.
- Find the limiting behavior of y if there is one.
- Estimate the blow-up time if it is finite.
- You might need several plots. You might need to increase **numpoints** if the plot looks jagged.

Problem 15

- (a) Be sure to answer all the questions. This includes:
  - What appears to be happening as x increases?
- (b) A good way to compare the solutions for different step sizes is to plot them together.
- (d) Be sure to discuss (with illustration) the dependence of the solution on the initial value.

Problem 16

- Think about values for digits. Explain why the number you've chosen should give the correct accuracy.
  - You should be able to get agreement of the numerical approximation and e^x to 15 digits.
- Remember to use **evalf**.