

TI-89 – Slope Fields, Euler, etc. (assuming basic TI-89 knowledge)

General set-up:

(This only needs to be done once.)

Mode → Graph → Diff Equations
 ◇ Y= → F1 → (9) Graph Formats
 Set: Solution Method → Euler
 Fields → Slpfld

To graph a slope field:

Under ◇Y= , enter the differential equation in $y1' =$.

Ex: $y1' = .2 * y1 * (4 - y1)$ (Those are regular multiplication asterisks.)

Set the desired Window (using x - and y -values) and Graph.

To plot a solution to a differential equation using Euler's Method:

As before, enter the differential equation under $y1'$.

The initial condition will be seen in the ◇ Y= menu as the point $(t0, yi1)$, and you will need to enter each of these coordinates in the appropriate places. Set your window, including $tstep$. This is the step size that Euler's Method will use. Set it to something reasonable for your window – so that you will have about 40 – 100 steps across the screen. (As usual, more steps are better, but also slower.)

(1) With a specific initial condition given on the solution curve:

Ex: $y1' = .2 * y1 * (4 - y1)$, with initial values $(0, .3)$

You should have:

$$\begin{aligned} t0 &= 0 \\ y1' &= .2 * y1 * (4 - y1) \\ yi1 &= .3 \end{aligned}$$

(2) By interactively choosing a starting point on the solution curve:

Again, enter $y1'$ as before. (Ignore $t0$. Leave $yi1$ blank.) Graph, using

◇ Graph. (This will graph only the slope field.)

From this window with the slope field, choose F8.

Two choices:

- (1) Use the cursors to move to the desired point (approximate) and press Enter.
- (2) Start typing numbers to enter the desired value of $t0$. Press Enter and type in the desired value of $yi1$. Press Enter.

Alternatively, instead of entering a specific fixed point, you may go to Window and set "ncurves" to some (positive integer) number other than 0. This will graph that number of typical solution curves in your chosen window.