

The EULER Program (TI-83)

To use this program:

- Entering the question: Make sure that your differential equation is in the form $dy/dx = f(x,y)$.
 - Type the equation $f(x,y)$ in " $y_1=$ " (keep your x as x and your y as y).
 - Go to your home screen and run the program.
 - (x_0, y_0) is your initial condition. When it asks " $x_0, y_0=?$ ", type your initial x value and hit enter, then type your initial y value and hit enter.
 - h is the step size
 - n is the number of steps you want the program to calculate at a time.
- Extra Functionality:
 - "continue?" this is asking whether you want the next y value using the same initial conditions and step size you already entered. (1 = yes, 0 = no)
 - "new h and n ?" this is asking whether you want to change your step size. Note: this change will take place at your current x value. It does not restart the entire problem. (1 = yes, 0 = no)
- Example: $dy/dx = x+y$, $y(0) = 1$. You want $h = 0.1$ and the x -values from 0 to 1.
 - Type $y_1="x+y"$, $x_0=0$, $y_0=1$, $h=0.1$, and $n=1$, then the program would give back $y(0.1)$. Enter "1" when it asks if you want to continue. Then the program gives you back $y(0.2)$. If you wanted $y(1)$ without all the intermediate steps at the beginning instead of typing $n=1$, type $n=10$, and the program will display $y(1)$.

EULER

```
:ClrHome
:Disp " "
:Disp "X0,Y0 = ?"
:Input U
:Input V
:Lbl 2
:Prompt H,N
:Lbl 3
:For(J,1,N,1)
:U→X
:V→Y
:Y+HY1→V
:U+H→U
:END
:ClrHome

:Disp " "
:Disp "X ="
:Disp U
:Disp "Y ="
:Disp V
:Disp " "
:Input "CONTINUE?",Q
:If Q=1
:Goto 3
:Input "NEW H AND N ?",Q
:If Q=1
:Goto 2
```