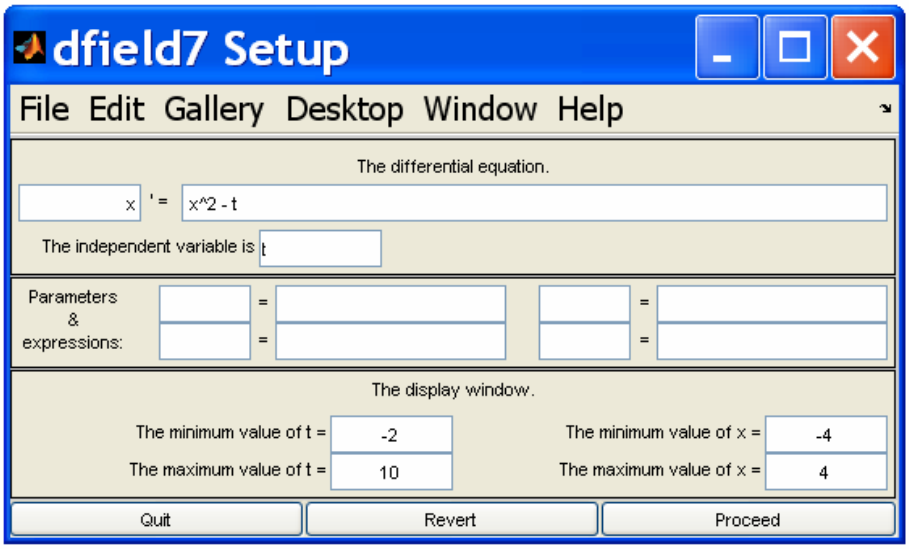
## *dfield7*

1. From the *Useful Links* course web page, follow the link to the PPLANE web site (for source files). Choose the link called *For use with version 7.0 of MATLAB* and download *dfield7.m* (right-click on the link and save the file as *dfield7.m* in the MATLAB directory of your computer).

2. Then, start MATLAB and set the working directory (at the top of the MATLAB window) to the directory where you saved the file *dfield7.m*.

3. Type `dfield7` at the MATLAB prompt. The window below should appear.




4. If you click on the *Proceed* button, a new window will appear, with the slope field for the differential equation $x' = x^2 - t$, for $-2 \le t \le 10$ and $-4 \le x \le 4$.

5. Clicking anywhere in this window will plot the solution curve going through the point that was clicked.

6. Take a few minutes to familiarize yourself with the software. Change the differential equation and the ranges for $x$ and $t$. Plot a few solution curves.

**Note:** the University of Arizona has a MATLAB site license. You may download a copy for your own computer by following the instructions posted at https://sitelicense.arizona.edu/matlab/. You will need your NetID to download MATLAB.

## *Plotting functions with MATLAB*

Say you want to plot the function $f(t) = t^3 - 3\,t^2 + t - 7$, for $t$ between –3 and 8.

1. Define a row vector containing the values of $t$, say with a step of 0.1. To this end, type
`t = -3:0.1:8;`
at the MATLAB prompt. The semicolon at the end indicates that the vector `t` should not be displayed on the screen.

2. Then, define a row vector containing the values of $f(t)$, by typing
`f = t .^ 3 - 3 * t .^2 + t - 7;`
In the above formula, `*` denotes multiplication, `^` power, and a dot (`.`) before an operator means that the operation should be performed on each element of the vector `t`.

3. To plot the graph of $f$ as a function of $t$, type
`plot(t,f)`
at the MATLAB prompt. To plot the graph in red, type `plot(t,f,'r')`. Standard colors are black (`k`), blue (`b`), red (`r`), green (`g`), cyan (`c`), magenta (`m`), yellow (`y`), and white (`w`). To make the curve thicker, type for instance
`plot(t,f,'LineWidth',2)`.