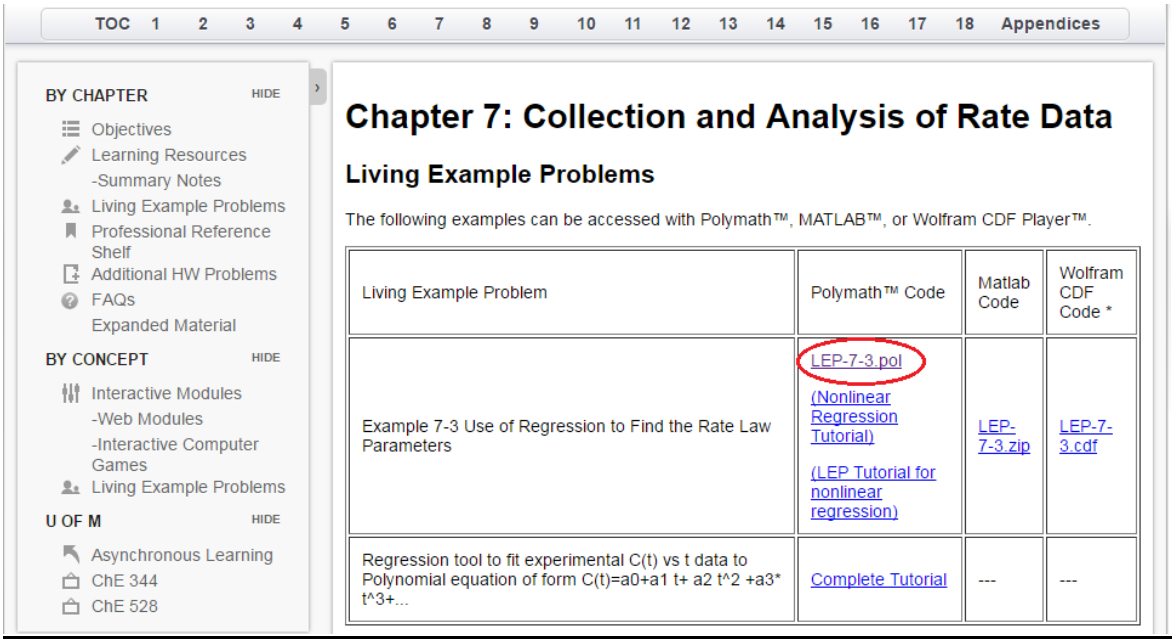
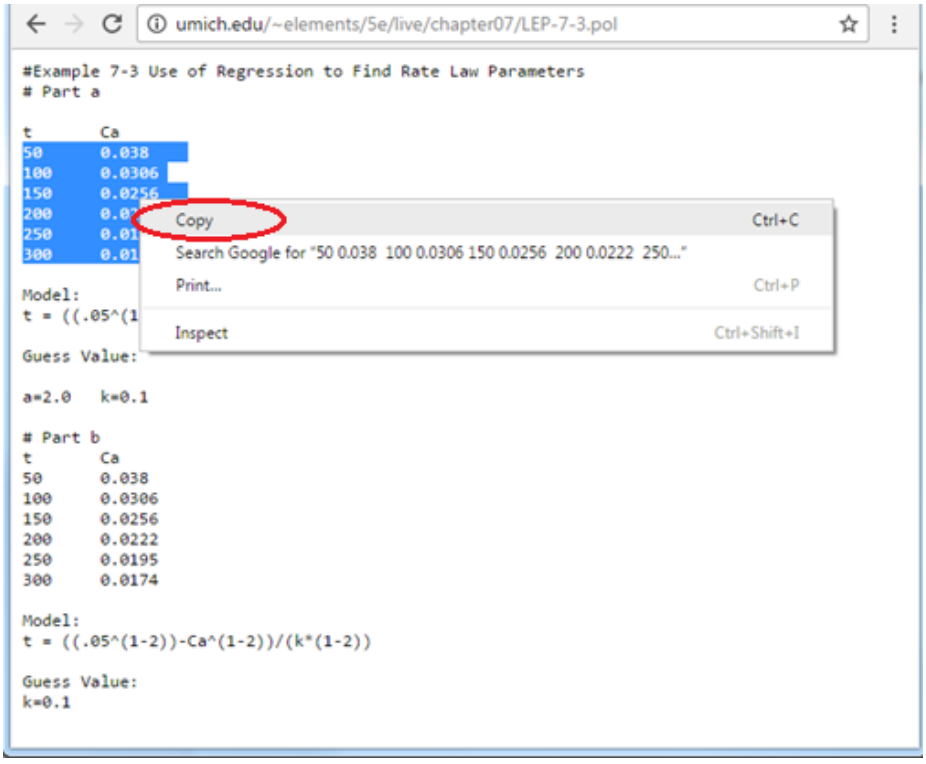
Tutorial to run LEP nonlinear regression code

Step 1: Open chapter 7 and click on LEP-7-3.pol to view Polymath code for Example 7-3

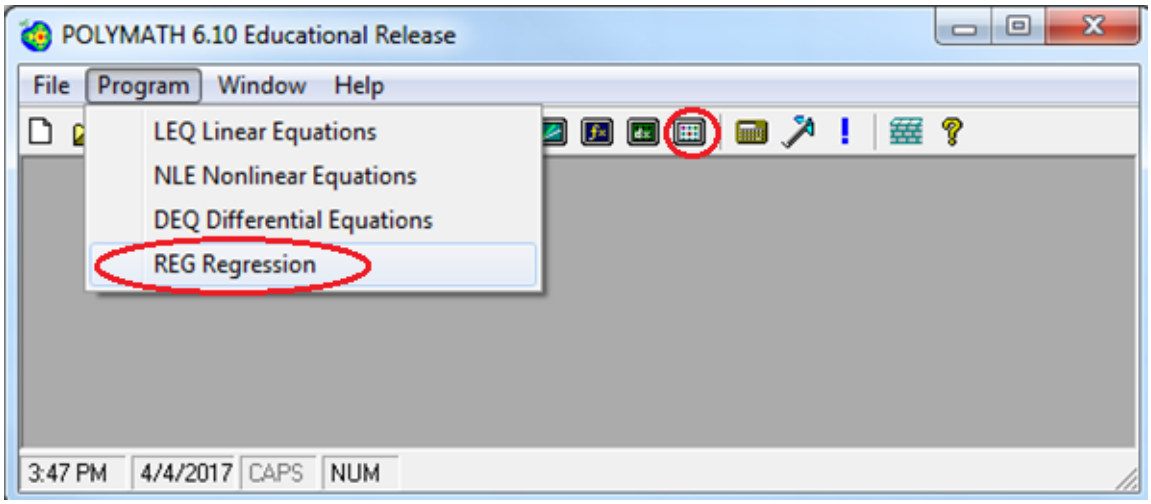


Step 2: The following page will open. We will carry out regression for first part of the problem where you need to determine both a and k . Copy the data of t and Ca as shown below

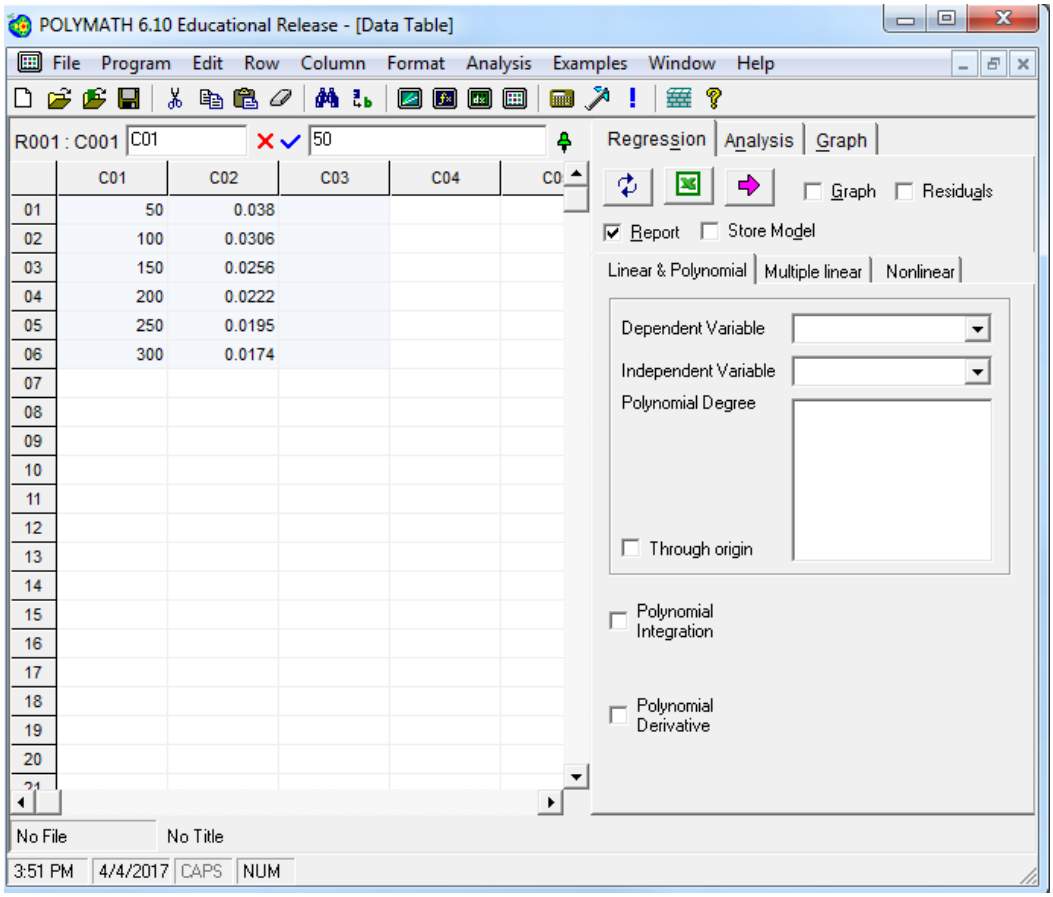


Step 3: Open Polymath. If you don't have it then refer to the installation instruction present on http://www.umich.edu/~elements/5e/software/polymath.html

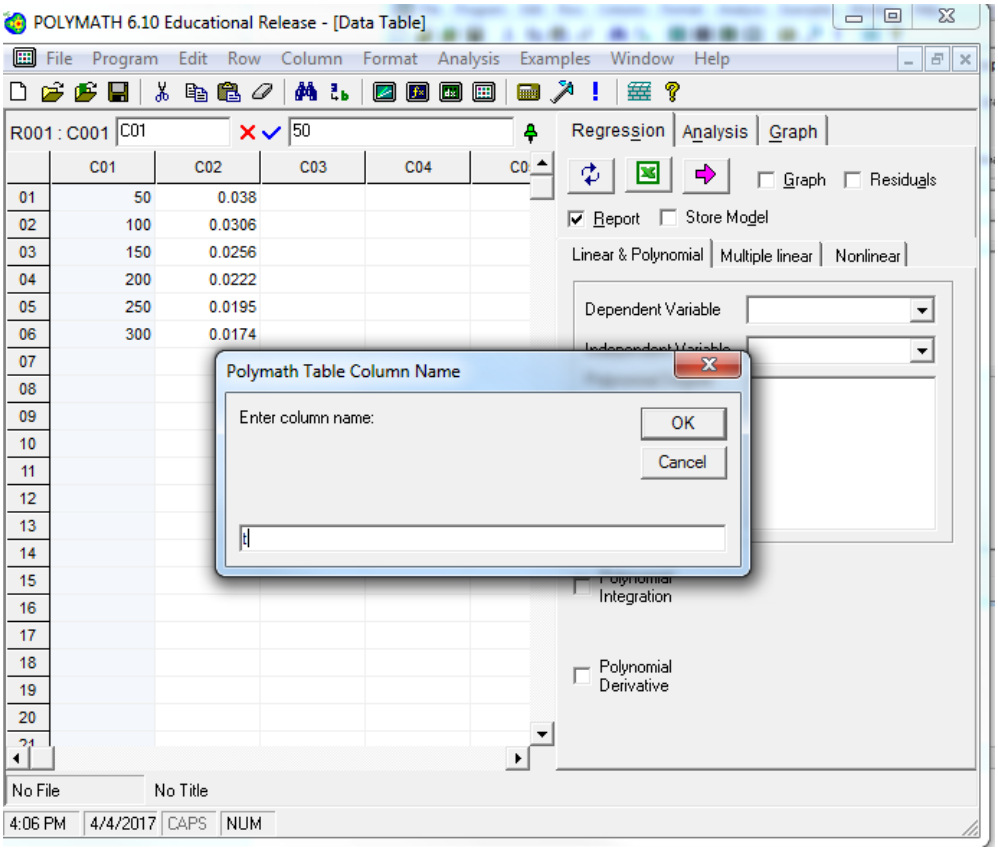
When you open, the following window will appear. Click on Program tab and select "REG Regression". The shortcut button for REG is also available on menu bar as shown below by red circle



Step 4: A blank spreadsheet will open. Right click on cell corresponding to row 01, column C01 and paste the data. Your spreadsheet should look like this. For a detailed tutorial on nonlinear regression, refer to http://umich.edu/~elements/5e/software/polymath.html

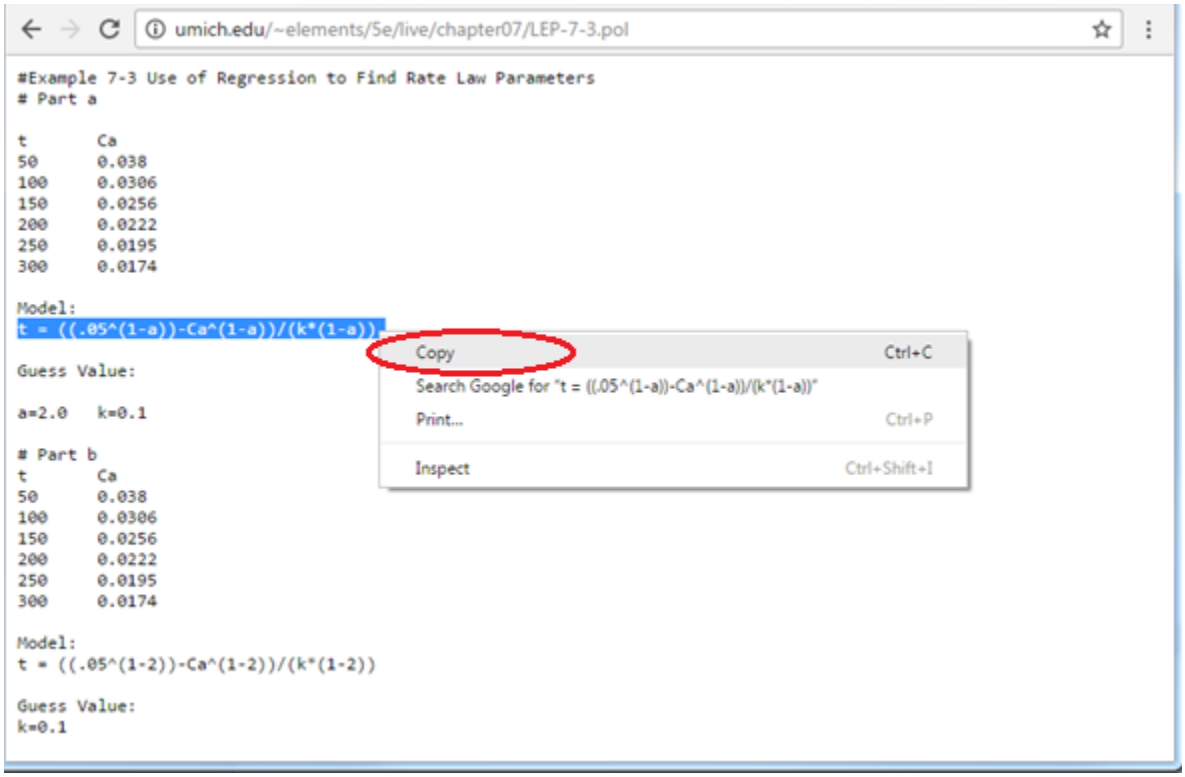


Step 5: Change the column name of C01 to t. To change the column name of C01, double click on the column name "C01" or right click on C01 and select "Column Name..." A dialog box will appear where column name can be changed. Enter t in the column name and click OK

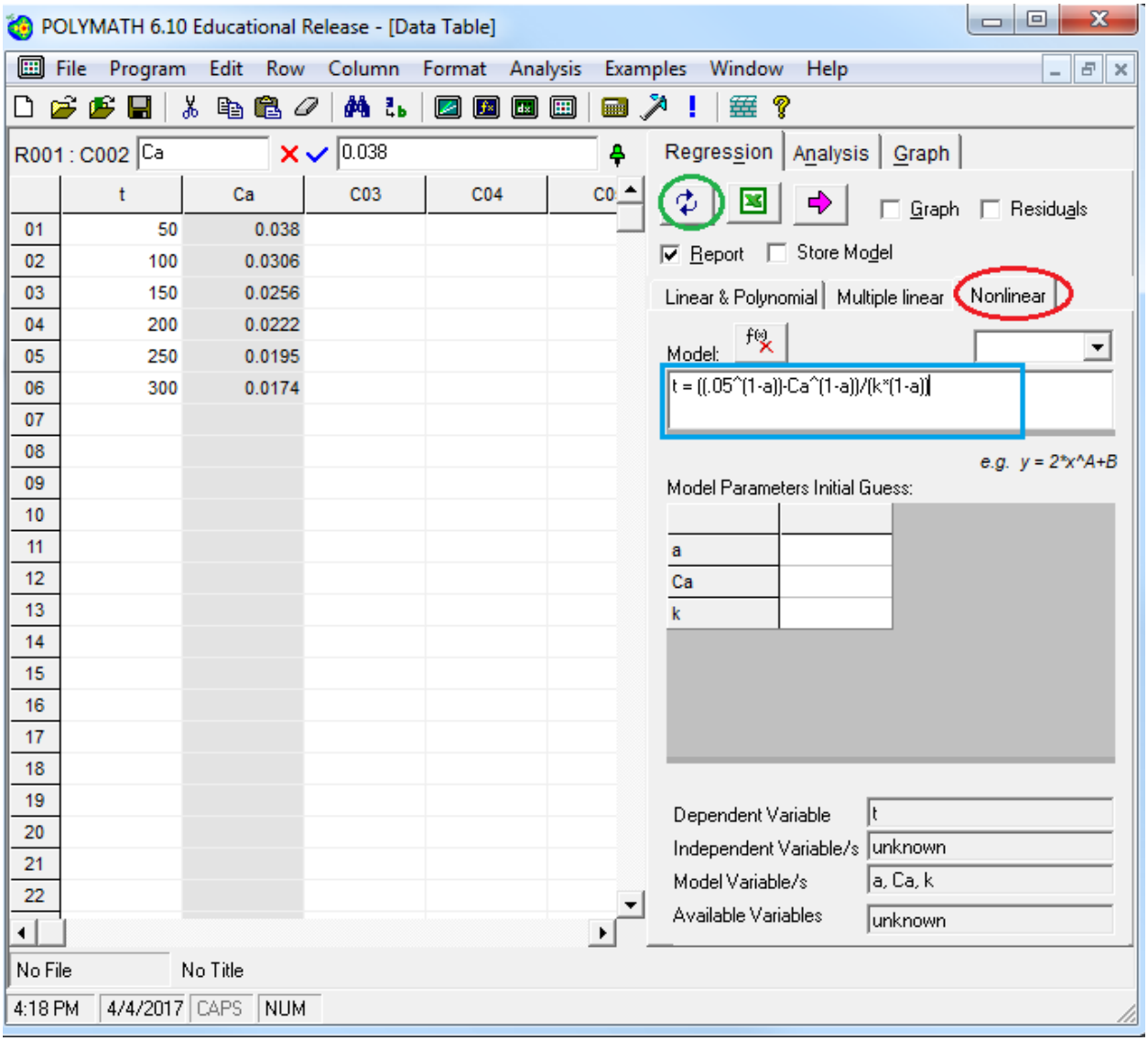


Similarly, change the column name of C02 to Ca

Step 6: Now go back to Polymath code page on website (**Step 1**) and select the equation for t as shown below



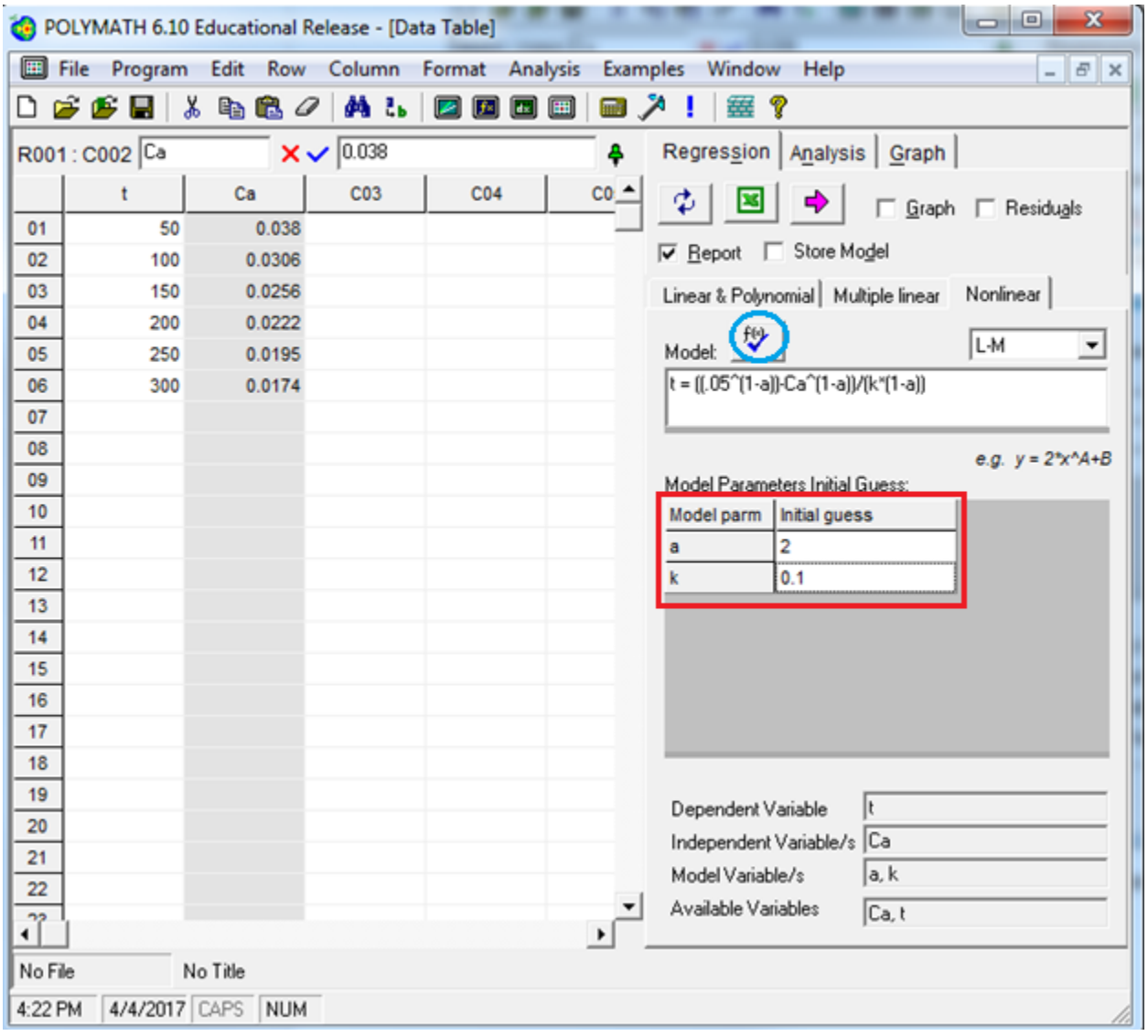
Step 7: Go back to your Polymath software and click on Nonlinear (red circle). Place the cursor in the rectangular box below "Model:" and paste your equation (blue rectangle). Click on the refresh button (green circle) to update the page.



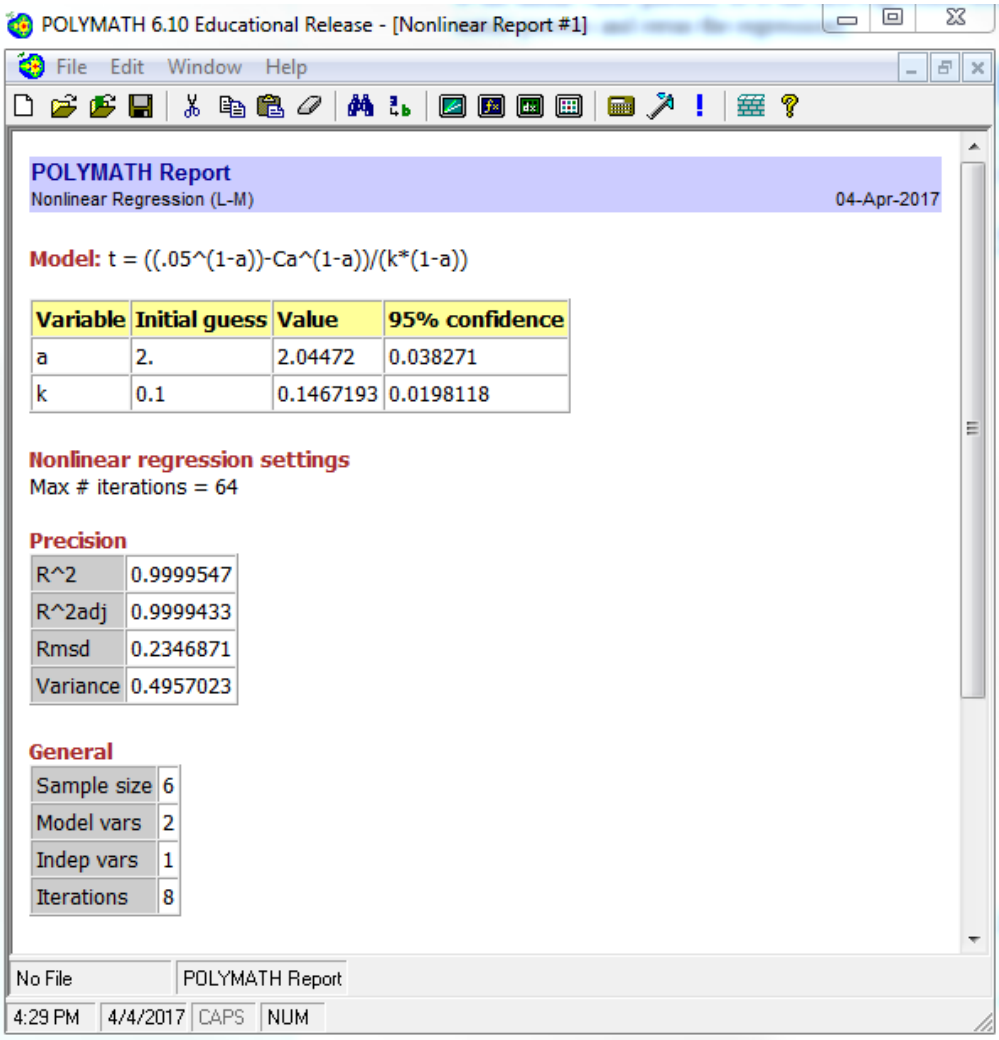
Step 8: Now you need to enter the guess value of the model parameters. The model parameters are a and k. Go back to the Polymath code (Step 1) and you will find that guess value is already given. Guess value given for a is 2 and for k it is 0.1. Enter the guess value under "Model Parameters Initial Guess" section.

If it displays Ca also in the model parameter list, then click on f(x) button. It will remove Ca from the parameter list.

You can also choose your own guess value (Note: The solution Polymath provides may be very sensitive to the initial value guesses, so if the first regression solution is not very good, you may want to change the initial guesses and rerun the regression).



Step 9: When you are done, click on pink arrow  to have Polymath perform the regression. You will see a screen like this that details the results from the regression analysis. You can see that R^2 =0.999 which indicates a very good fit



From the above report

a = 2.044
k =0.1467

Step 10: Now, you can go back to Step 1 and repeat the Step 2-9 to do the second part of Example 7-3