Spring 2007 Math 120, Section 5

Linear Regression on the TI-84

In this document I will detail how do linear regression using a TI-84 Plus (Silver Edition) calculator. Similar TI's should work in an analogous way. For other models, please see your calculator's documentation.

Before proceeding, make sure you locate the following keys on your calculator: ENTER, CATALOGUE (this is above the zero button), STAT, VARS, 2ND, Y=, STAT PLOT (this is above the Y= button), WINDOW and GRAPH.

1. Clear your screen and clear any formulas you have standing in for $Y =$.

2. Before we can start, it is necessary that your calculator is set up to report the correlation coefficient with the slope and intercept estimates. To do so, go into the catalogue. This is an alphabetic listing of all your calculator functions. You enter the catalogue by pressing the 2ND key followed by the zero button (this combination gives you the CATALOGUE key). Scroll down the list to the entry that reads DiagnosticOn. Press Enter, and the words DiagnosticOn will appear on your screen. Press Enter again and the word Done will appear on your screen. Your calculator is now set up to report your correlation coefficient.

3. Next you must enter the data into your calculator. To do so, you must enter the data as a list. Press the STAT button. The cursor will be highlighting the number one next to the word EDIT. This is what we want, so hit Enter. You are now looking at a blank table with columns headed by L1,L2,L3,etc. You will only use two columns. Clear out any pre-existing data. The L1 column is where you will put the data for your independent variable (the input values). In the L2 column, enter in the data for the dependent variable (the output values). Output values should be entered directly to the left of the input values, or your calculator will not see the correspondence. When you are done, proceed to the next step.

4. In this step, you will tell your calculator that you want to graph your data (and later on the regression line). Go into STAT PLOT - which is accomplished by pressing the 2ND button followed by the Y= button. The number 1 should be highlighted, next to the word Plot1. Press enter. The word ON should be highlighted. If not, move the cursor over the word ON. Then press Enter. Now the calculator knows you want to plot data. The rest of the options in this window are for various preferences. The Type of plot you probably want is scatterplot, which is the first in the list of six. Highlight that plot and press Enter. Your X-List should be L_1 and Y-List should be L_2 (this tells the calculator that the data listed under L_1 constitutes the inputs and the data listed under L_2 constitutes the outputs). If this is not already the case, fix it. Finally, you can specify what shape you want the calculator to mark on the graph for your data points. When you have this set-up, proceed to the next step.

5. Set your viewing window appropriately so that the data will show up on your graph. You can do so by pressing the button WINDOW. The Xmin value should be a little bit lower than your lowest input, the Xmax value should be a bit larger than your largest input, the Ymin value should be a little but lower than your lowest output, and the Ymax value should be a little larger than your largest output. Once this is set, press the GRAPH button. You should

now see a scatterplot of your data! Hopefully this should look like a line. If your plot isn't clear or is missing data, press WINDOW and adjust your viewing window and resolution.

6. Now we can have the calculator perform the regression and estimate the slope and intercept of the line that fits your data best. Press the STAT button. Move the cursor to the right by one so that it highlights CALC. Move the cursor down by four so the number 4, next to the words LinReg($ax + b$) is highlighted. Press Enter. The command will now appear on your screen. Press Enter again. You will now see the estimate for your line! You will be given a value for a number called a and a number called b. The first corresponds to the slope and the second corresponds to the intercept. This is why your calculator says $y = ax + b$ at the top of the screen. You should also have the correlation coefficient reported to you. It will be in two forms, one will read r^2 and the other will read r. As it should be obvious, r^2 is just the square of the r value. If the correlation coefficient is not reported to you, repeat step two above so that your calculator is in the DiagnosticOn mode, then re-enter the LinReg command as instructed in this step.

7. Would you like to see your regression line plotted amongst your data points on the scatterplot? If so, press the Y= button. The cursor should be next to $Y_1 =$. Press the VARS button. Move the cursor down to the fifth entry - Statistics. Move the cursor on the top to the right by two to highlight EQ. The number one, next to RegEq (for regression equation), should be highlighted. Press enter. The formula for your regression line will now appear next to $Y_1 =$. Press GRAPH and you will see your line.

Now that your calculator has done all the computations for you, it is up to you to interpret what your calculator has reported.