# Linear Regressions

## **On TI Graphing Calculators**

If you type data into your calculator and it appears to be linear, it can find the equation of the line for you. This process is called performing a linear regression.

## Calculator Set Up

1. Make sure that your calculator has the Plots Off, Y= functions cleared, the MODE and FORMAT are set at “stage left”, and the lists are cleared.
2. Turn the Diagnostics on.
* Press 2nd the CATALOG (2nd of 0). Press the teal D button (ALPHA of x-1) This brings you to the items in the catalog that start with D.
* Arrow down until you reach the command DiagnosticOn and press ENTER.
* Press ENTER a second time. Later, when you perform a linear regression, you will see an “r” value. If that value is close to a ±1 there’s a strong correlation to the data, meaning the data points can be modeled by the line well.

## Enter the Data

Data for this lab will be stored in L1 and L2.

* Press the STAT menu and choose option 1:Edit…
* Type the first value in the L1 table, then press ENTER, type the second value next, and so forth.
* Arrow over to the L2 table and enter the corresponding dependent values
* Make sure there is an equal amount of data in both L1 and L2 so you don’t get a “dim mismatch” error.

## Performing a Linear Regression

* To view your data, you must set up a stat plot. Press 2nd STAT PLOT (2nd of Y=). Press ENTER to set up Stat plot 1. Set up your stat plot to look like the one at the right. Then press the ZOOM key and choose option 9:ZoomStat.
* To find an equation that matches the data you see, you need to perform a linear regression on the data. Press the STAT menu and arrow to the right to the CALC menu. Choose option 4:LinReg (ax+b). Type L1, a comma, L2, then the VARS button, arrow over to Y-VARS, choose 1:Function, the 1:Y1 option, then press ENTER.

When you press the GRAPH button a line that matches your data points will also be in your viewing window. Pressing the Y= button will give you the equation of that line.

Let’s have the calculator find the line of best fit for wing length vs. wing-beat rate.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Flamingo** | **Shell Duck** | **Velvet Scooter** | **Fulmar** | **Great Egret** |
| **Wing Length (mm)** | 400 | 375 | 281 | 321 | 437 |
| **Wing-Beat Rate (bps)** | 2.4 | 3.0 | 4.3 | 3.6 | 2.1 |

Equation of your line \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Correlation Coefficient \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_