Using the LNRGTINT Program

This program is designed to work on TI-83/84 calculators as a general linear regression model. The purpose is to provide confidence intervals for each estimate in the general linear regression model. An example is given below:

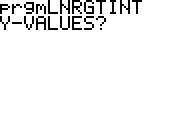
Example: Suppose we have the following data:

|  |  |  |
| --- | --- | --- |
| Y | X1 | X2 |
| 4.3 | -1.5 | -0.1 |
| 5.5 | -0.5 | -0.1 |
| 6.8 | 0.5 | -0.1 |
| 8.0 | 1.5 | -0.1 |
| 4.0 | -1.5 | 0 |
| 5.2 | -0.5 | 0 |
| 6.6 | 0.5 | 0 |

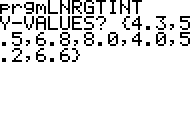
Answer the following:

1. Estimate a linear model of the form: .
2. Determine the estimate for the population variance.
3. Determine the 95% confidence interval for each .
4. Determine the variance estimate for each .

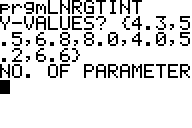
Now we’ll call up the program and enter in the data:



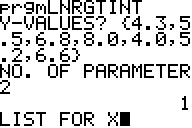
Enter in the y-values as a list.



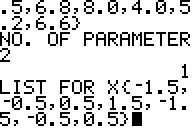
Enter in the number of X-values you want to use in your general linear model:



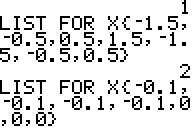
We have 2 independent variables in this example, so we enter 2. Now enter in the data for x1:



The number circled is the value of *i* in the xi-values. So this number tells the user which x-variable is being entered in.

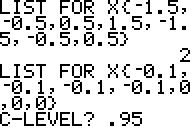


Now we enter the data for x2, notice the counter has changed to let the user know that.

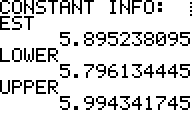


Now the counter has incremented up to 2, so we are entering x2 data.

Now enter the confidence level you wish to use as a decimal.

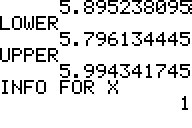


The program will now output the information. It outputs the information about the constant first:

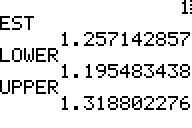


The program will pause to make sure you are ready to continue. The estimate for (the constant term) is 5.895 and the confidence interval is (5.796, 5.994).

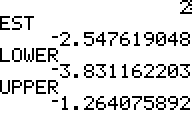
Now the program will continue to produce the estimates and the confidence intervals for the other parameter estimates. It will pause after each message of INFO FOR X1 to make sure you’re ready (the output lines are large enough where a user may lose their place, so I had it pause each time).



Hit ENTER again to see the output for the rest of the parameter estimates.

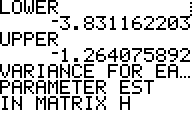
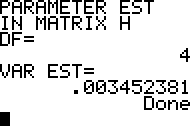


So for x1 we have an estimate of 1.257 and a confidence interval of (1.195, 1.318).

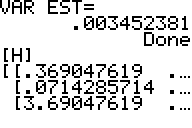
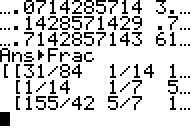


For x2 we have an estimate of -2.547 and a confidence interval of (-3.831, -1.264).

Now the program will tell you where to find the variance estimates for each parameter, they are in matrix H. Each diagonal entry corresponds to the variance estimate for each parameter. Entry (1,1) corresponds to 0, entry (2,2) corresponds to 1, etc. The other entries are co-variances. The rest of the program is to output the degrees of freedom and the estimate for 2 for the general linear model.

So now going under Matrix H we can find the variance estimates for each parameter.

The table below gives these estimates:

|  |  |  |
| --- | --- | --- |
| 0 | 1 | 2 |
| 31/84 | 1/7 | 1300/21 |

I hope this program will be useful for you. Enjoy!