Using The TI-83 for Hypothesis Testing for a Population Correlation Coefficient

You can use the TI-83 calculator to conduct hypothesis testing for a population correlation coefficient.

Hypothesis testing for a population correlation coefficient, \( \rho \), can be one tailed or two tailed:

\[
\begin{align*}
\text{Ho: no significant negative correlation} & \quad \text{Ha: significant negative correlation} \\
\text{Ho: no significant positive correlation} & \quad \text{Ha: significant positive correlation} \\
\text{Ho: no significant correlation} & \quad \text{Ha: significant correlation}
\end{align*}
\]

For this class, we will ONLY CONSIDER HYPOTHESIS TESTS FOR \( \rho \) THAT ARE TWO TAILED.

Example

Let’s look at our latitude and temperature example from class. Enter the x-values (north latitude) in L1 and y-values (April temperature) in L2. Hit STAT and arrow over to the TESTS menu. Arrow down and select E:LinRegTTest (linear regression t test). Select L1 as the Xlist and L2 as the Ylist. Leave Freq at 1 and select the type of test you are conducting (either two-tail, right tail, or left tail depending upon the alternate hypothesis Ha from above). For our example, we will use a two-tail test. Leave RegEQ blank and then highlight Calculate and hit the ENTER key.

The results of our hypothesis test are displayed. These are: the t test statistic (t = -5.6971), the p–value (p = 4.5589E-4 or 0.00045), the degrees of freedom (d.f. = 8 = n–2), the y-intercept (a = 104.1780) and slope (b = -0.9830) of the regression equation, the sample standard deviation (s = 8.8659), the correlation coefficient (r = -0.8957) and the coefficient of determination (r² = .8023).

PLEASE NOTE: The regression equation on this screen (y = a + bx) is different than the one on the regression from the CALC menu (y = ax + b). The regression equation is the same, but the values of a and b are different on both screens.

From the screen above, we would reject Ho (large t test statistic and very small p–value) and conclude that there is a significant correlation between latitude and temperature.