Correlation, Regression & TI

Tips & Notations:

1. Working with a set of ordered–pairs.

2. Do the following only once: 2nd [0], scroll down to DiagnosticOn, followed by pressing ENTER twice.

3. Preparation:
   (a) Enter $x$ values in list $L_1$.
   (b) Enter corresponding $y$ values in list $L_2$.

Finding

- Equation of the regression line $y = a + bx$
- Correlation coefficient $r$
- Coefficient of determination $r^2$

1. Without menu: STAT > CALC > 8:LinReg(a+bx) > $L_1$, $L_2$ > ENTER

2. With menu: STAT > CALC > 8:LinReg(a+bx)
   - Xlist: $L_1$
   - Ylist: $L_2$
   - FreqList: blank
   - Store RegEQ: blank
   - Calculate Choose to execute
Testing correlation coefficient \( r \):

\[ H_0 : \rho = 0 \Rightarrow \text{Linear Correlation is not significant} \]

\[ H_1 : \rho \neq 0 \Rightarrow \text{Linear Correlation is significant} \]

Method I: Using Pearson Correlation Coefficient Method

1. Find PCC–CV Using TI:
   
   \[
   \text{PRGM} > \text{RVAL} > \text{ENTER (Twice)} > 2: 2 \text{ TAIL TEST},
   \]
   
   now follow on display instructions.

2. Conclusion:
   
   - When \(|r| > \text{PCC–CV}\), then Linear Correlation is significant
   - When \(|r| \leq \text{PCC–CV}\), then Linear Correlation is not significant

Method II: Using Traditional or P–Value Method

1. Find C.T.S. and P–Value Using TI:
   
   \[
   \text{STAT} > \text{TESTS} > \text{LinRegTTest}
   \]
   
   - Xlist: \( L_1 \)
   - Ylist: \( L_2 \)
   - Freq: 1
   - \( \beta \ & \rho : \neq 0 < 0 > 0 \)
   - RegEQ: blank
   - Calculate Choose to execute

2. Find C.V. Using TI:
   
   \[
   \text{PRGM} > \text{TVAL}, \text{using 2: 2 TAIL TEST with df} = n - 2
   \]

3. Conclusion: Use testing chart

Predicting \( y \) value for a given \( x \) value:

- Use \( y = a + bx \) when linear correlation is significant
- Use \( \bar{y} \) when linear correlation is not significant