

Significance of Correlation Coefficient

If the value of correlation coefficient is zero there is no relationship between variables. Hypothesis testing for population correlation coefficient can be done to determine the significance of the correlation coefficient or significance of the relationship between variables.

Given below are the hypothesis and equation for test statistics used to test significance of correlation coefficient.

Hypothesis

$$H_0 : \rho = 0$$

$$H_1 : \rho \neq 0$$

Test statistic

$$T = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}} *$$

Example 1.5

If correlation Coefficient of sample is 0.928 and sample size is 24, test the significance of the correlation coefficient of population with 95% of confidence

Answer

Hypothesis

$$H_0 : \rho = 0$$

$$H_1 : \rho \neq 0$$

Significance level = 0.05

Test statistic

$$T = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}} *$$

$$T = \frac{0.928 \sqrt{22}}{\sqrt{1-0.928^2}} *$$

$$T = 11.637$$

Critical Value for t can be derived from t table (Refer to a T-table with $\alpha/2 = 0.05/2 = 0.025$)

Critical Value $t_{\alpha/2, n-2} = \pm 2.074$

Test statistic is in the rejection region. Therefore H_0 is rejected. It can be concluded with 95% of confidence that the correlation coefficient is significantly different from zero. There is a significant relationship between given independent and dependent variables.