

What is the P-value of the correlation coefficient in R?

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The P-value of the correlation coefficient in R is a statistical measure that indicates the probability of obtaining a correlation coefficient at least as extreme as the one observed in a sample, assuming that the null hypothesis is true. It is a way to assess the strength and significance of the relationship between two variables in a dataset. A lower P-value suggests a stronger correlation between the variables, while a higher P-value indicates a weaker or non-existent relationship. In general, a P-value of less than 0.05 is considered statistically significant, meaning that the observed correlation is unlikely to have occurred by chance. Overall, the P-value of the correlation coefficient is a useful tool for determining the validity and reliability of a correlation analysis.

Find the P-value of Correlation Coefficient in R

The can be used to measure the linear association between two variables.

This correlation coefficient always takes on a value between -1 and 1 where:

-1: Perfectly negative linear correlation between two variables.
0: No linear correlation between two variables.
1: Perfectly positive linear correlation between two variables.

To determine if a correlation coefficient is statistically significant, you can calculate the corresponding t-score and p-value.

The formula to calculate the t-score of a correlation coefficient (r) is:

$$t = r\sqrt{n-2} / \sqrt{1-r^2}$$

The p-value is calculated as the corresponding two-sided p-value for the t-distribution with n-2 degrees of freedom.

To calculate the p-value for a Pearson correlation coefficient in R, you can use the `cor.test()` function.

```
cor.test(x, y)
```

The following example shows how to use this function in practice.

Example: Calculate P-Value for Correlation Coefficient in R

The following code shows how to use the `cor.test()` function to calculate the p-value for the correlation coefficient between two variables in R:

```
#create two variables
```

```
x <- c(70, 78, 90, 87, 84, 86, 91, 74, 83, 85)
```

```
y <- c(90, 94, 79, 86, 84, 83, 88, 92, 76, 75)
```

```
#calculate correlation coefficient and corresponding p-value
```

```
cor.test(x, y)
```

Pearson's product-moment correlation

data: x and y

t = -1.7885, df = 8, p-value = 0.1115

alternative hypothesis: true correlation is not equal to 0

95 percent confidence interval:

-0.8709830 0.1434593

sample estimates:

cor

-0.5344408

From the output we can see:

The Pearson correlation coefficient is -0.5344408. The corresponding p-value is 0.1115.

Since the correlation coefficient is negative, it indicates that there is a negative linear relationship between the two variables.

However, since the p-value of the correlation coefficient is not less than 0.05, the correlation is not statistically significant.

```
#create two variables
```

```
x <- c(70, 78, 90, 87, 84, 86, 91, 74, 83, 85)
```

```
y <- c(90, 94, 79, 86, 84, 83, 88, 92, 76, 75)
```

```
#calculate p-value for correlation between x and y  
cor.test(x, y)$p.value
```

```
0.1114995
```

The p-value for the correlation coefficient is 0.1114995.

This matches the p-value from the previous output.