

How can I perform Bartlett's test in Python, step-by-step?

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Bartlett's test is a statistical test used to determine if the variances of two or more groups are equal. This test is commonly used in data analysis to assess the homogeneity of variances in different groups. To perform Bartlett's test in Python, follow these steps:

1. Import the necessary libraries: First, import the necessary libraries such as `scipy.stats` and `numpy` to perform the test.
2. Prepare the data: Make sure the data is organized in a tabular format with each group in a separate column.
3. Calculate the variance for each group: Use the `numpy.var` function to calculate the variance for each group.
4. Create an array with the variances: Create a `numpy` array with the variances calculated in the previous step.
5. Perform the test: Use the `scipy.stats.bartlett` function to perform the test. Pass the array of variances as the input.
6. Interpret the results: The test will return a test statistic and a p-value. If the p-value is less than the chosen significance level (usually 0.05), it indicates that the variances are significantly different. If the p-value is greater than the significance level, it suggests that the variances are equal.

In conclusion, by following these steps, you can easily perform Bartlett's test in Python to assess the homogeneity of variances in your data.

Perform Bartlett's Test in Python (Step-by-Step)

is a statistical test that is used to determine whether or not the variances between several groups are equal.

Many statistical tests (like a) assume that variances are equal across samples. Bartlett's test can be used to verify that assumption.

This test uses the following null and alternative :

H0: The variance among each group is equal.

HA: At least one group has a variance that is not equal to the rest.

The test statistic follows a Chi-Square distribution with $k-1$ degrees of freedom where k is the number of groups.

If the corresponding of the test statistic is less than some significance level (like $\alpha = .05$) then we can reject the null hypothesis and conclude that not all groups have the same variance.

The following step-by-step example explains how to perform Bartlett's test in Python.

Step 1: Create the Data

To determine if three different studying techniques lead to different exam scores, a professor randomly assigns 10 students to use each technique (Technique A, B, or C) for one week and then makes each student take an exam of equal difficulty.

The exam scores of the 30 students are shown below:

#create data

A =

B =

C =

Step 2: Perform Bartlett's Test

To perform Bartlett's test, we can use the `scipy.stats.bartlett()` function.

Here's how to use this function in our example:

```
import scipy.stats as stats
```

```
#perform Bartlett's test  
stats.bartlett(A, B, C)
```

```
BartlettResult(statistic=3.30243757,  
pvalue=0.191815983)
```

The test returns the following results:

Test statistic B: 3.3024 P-value: 0.1918

Since the p-value is not less than 0.05, the professor will fail to reject the null hypothesis. In other words, she

doesn't have sufficient evidence to say that the three groups have different variances.

Thus, she can proceed to perform the one-way ANOVA.

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