# EEGpal: **Statistics module**

Version 1.0, 15.02.2025

The module 'Statistics' has for purpose to compare statistical differences for each Time Frame (TF) and each electrode of interest. This is usually done during the exploration of the dataset to find period or interest or to study the difference of EEG amplitude between conditions (trace analysis).

The EEGpal produces outputs similar as what Cartool proposed in its own ‘Statistics on tracks’ option. However, it permits to perform ANOVA with several factors which is not possible in Cartool. It replaces the STEN toolbox created by Jean-François Knebel (<https://zenodo.org/records/1164038>).

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### Find peaks

A screenshot of a computer

Description automatically generated

1. Sampling rate of the data. Normally should be automatically transfer from the main windows. You can adjust if it is not the case.
2. Choose the action **Peaks detection.**
3. Specify the time interval. WARNING: The value 0 is the beginning of the file. This module doesn’t take account about possible .mrk file which could define another origin.   
   EoF=End of File.
4. Specify the electrode to study, Specify the indices of the electrodes (1 2 64) and not the name specified by the coordinate file (A1 A2 B32).
5. Specify if you want to detect positive peaks (looking for maxima) or negative peak (looking for minima).
6. In addition, you can detect the peaks for the average of specified electrodes in **4**, on the global field power (GFP) or on the global map dissimilarity (GMD).   
   The result for GFP and GMD is independent of the parameter **5**. Indeed, the values are always positive so the module will always return the maxima.
7. Select if the output file format: .xlsx or .txt (with tab as delimiter).
8. Specify if the peak position should be specified in millisecond (ms) or in time frame (tf) in the output file.
9. Select the output folder where the output will be recorded.
10. You can specify manually a suffix in the output file name. For example: *PeakDetection\_Positive\_98-122ms\_P1.xlsx*
11. Record an additional check. Read the section **How can I use the check file?** in the FAQ bellow**.**
12. Run the module to generate the output. After completion, you can press on Done or Cancel to close the module.

FAQ

**What the output looks like?**

A screenshot of a computer

Description automatically generated

The first columns are the amplitude, and the last columns are the position, either in milliseconds or in a time frame according to parameter **8**.

**Which Maltab commands are used to perform the statistical tests?**

The module uses the Matlab function *findpeaks*. It specifically looks for a high value surrounded by smaller values. This detection is not perturbate by the boundary of the interval (which are never detected as peak). This function only detects local maxima. To detect local minima, the signal is inverted. It is why you cannot detect a positive peak (max) and a negative peak (min) at the same time. You must perform two separate runs by changing the option **5**.

**Is a way to perform non-parametric statistic ?**

The non-parametric statistics is usfull when the number of participant is small which usually conduct to the non-respect of the normality of the data. The normality of the data is an assumption of the parametric test performed by EEGpal.