

Experimental Analysis of Algorithms

Lab 13. Statistical tests

For more than 2 groups:

- **Parametric test: ANOVA** (*ANalysis Of VAriance*): a statistical test of whether the means of several groups are equal (a generalization of *t-test* to more than two groups).

Example from W. Montelpare et al. *Applied Statistics in Healthcare Research*, [ch. 31 The One Way Analysis of Variance and Post Hoc Tests](#).

- **Non-parametric test: the Friedman test** (*Friedman's Two-way Analysis of Variance by Ranks*) is the nonparametric equivalent of the parametric *Two-way ANOVA*). It is used to test the difference between several related samples.

Homework

1. Consider the example from [here](#). Apply *One-Way ANOVA* and *post-hoc analysis* (the *Tuckey's* method or the *Scheffe* approach) on data.
(on paper and python)

For python:

- use `f_oneway` https://docs.scipy.org/doc/scipy/reference/generated/scipy.stats.f_oneway.html to perform *One-Way ANOVA* (returns the F statistic and the p-value)

- use `pairwise_tuckeyhsd()`

https://www.statsmodels.org/devel/generated/statsmodels.stats.multicomp.pairwise_tukeyhsd.html to perform the *Tuckey test*

- use functions from `scikit-posthocs` to apply the *Scheffe test* <https://pypi.org/project/scikit-posthocs/>

2. Follow the example from paper "Using nonparametric tests to compare the performance of metaheuristics" <https://juangvillegas.files.wordpress.com/2011/08/friedman-test-24062011.pdf>.

For python: <https://docs.scipy.org/doc/scipy/reference/generated/scipy.stats.friedmanchisquare.html>.