

# Nonparametric graphical tests of significance for the functional general linear model with application to forestry data

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Permutation methods are commonly used to test significance of regressors of interest in general linear models (GLMs) for functional data sets, as they rely on mild assumptions. Permutation inference for GLMs typically consists of three steps: choosing a relevant test statistic, computing pointwise permutation tests and applying a multiple testing correction. In this talk, I will present test statistics that together with the global envelope tests applied as the multiple testing correction allow for useful graphical interpretation of the test results [1, 2, 3]. As such, the tests are able to find not only if the factor of interest is significant but also which functional domain is responsible for the potential rejection, and between which groups of a categorical factor the differences occur. I will discuss the use of the graphical tests for examining the influence of species and other forest stand attributes on the vertical distribution of aerial light detection and ranging (LiDAR) returns [4]: Tree species have different shapes and forest stand dynamics. LiDAR is a technique that can measure the three dimensional position of reflective material by sending laser pulses through the canopy. We examined the influence of species, crown closure, and age on the vertical distribution of aerial LiDAR returns of regular, even-aged forest stands in Quebec, Canada.

## References

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