Abstract:
We present a synthesis of several papers written with co-authors and related to the construction of adaptive testing procedures in nonparametric statistics. We consider the examples of goodness-of-fit tests in a density model, homogeneity test for Poisson processes and the two sample testing problem. The first step in such a construction is to define a test statistic $T$ which behavior under the null hypothesis and under the alternative differs. We consider test statistics based on the estimation of the $L^2$ distance of the distribution of the observations under the null hypothesis and under the alternative. The testing procedures that we propose are non asymptotic: the level is guaranteed for all sample size. Several cases can occur: the most simple case is the case where the distribution of the test statistic $T$ under the null hypothesis is known, one can then determine the quantiles of this distribution and define the testing procedure. When the null hypothesis is composite, this distribution is generally unknown. One can then consider conditional tests, if it is possible to determine a random variable $Z$ such that the distribution of $T$ conditionally on $Z$ under the null is known. For the two sample testing problem in density, in regression or for Poisson processes, we use kernel procedures combined with bootstrap and permutation methods. Concerning the power of the testing procedures, we will see that the aggregation of several tests allows to adapt to the unknown structure of the alternative.