Consistent and focused tests based on transformations of processes

with application to the comparison of $\mathrm{AR}(p)$ vs $\mathrm{AR}(p+1)$ models for stationary time series

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Based on joint work with Alejandra Cabaña

Abstract

The statistical bibliography frequently refers to *omnibus tests* intended to be sensitive to all or at least a wide variety of alternatives, and *focused or directional tests* directed to detect efficiently some specific alternatives.

In fact, the apparent opposition between omnibus and focused is artificial, and, for instance, K-S test is focused on changes in position of Double Exponential distribution, as well as Cramér - von Mises is focused on changes in position of the distribution with density $f(t) = 1/(2\cosh(\pi t/2))$ and Watson tests are focused on changes in location or scale of Cauchy distribution.

We shall describe the design of omnibus tests focused on the alternatives chosen by the user, by applying suitable transformations to processes that describe the empirical information (empirical processes, or processes of accumulated residuals), imitating the behaviour of the classical tests.

Finally we shall consider the application of such tests to assess goodness-of-fit to $\mathrm{AR}(p)$ models focused on $\mathrm{AR}(p+1)$ for stationary time series.

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