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Model checks using residual marked empirical processes. (English) Zbl 1145.62071
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Summary: This article proposes omnibus goodness-of-fit tests of a parametric regression time series model. We use a general class of residual marked empirical processes as the buildingblocks for our testing problem. First, we establish a new weak convergence theorem under mild assumptions, one that extends previous existing asymptotic results and which may be of independent interest. This result allows us to study the asymptotic null distribution of the test statistics and their asymptotic behavior against Pitman's local alternatives in a unified way.

To approximate the asymptotic null distribution of the test statistics we give a theoretical justification of a bootstrap procedure. Our bootstrap tests are robust to conditional higher moments of unknown form, in particular to conditional heteroskedasticity. Finally, a Monte Carlo study shows that the bootstrap and the asymptotic results provide good approximations for small sample sizes and an empirical application to the Canadian lynx data set is considered.

MSC:

[62M10](#) Time series, auto-correlation, regression, etc. in statistics (GARCH)
[62F05](#) Asymptotic properties of parametric tests
[62E20](#) Asymptotic distribution theory in statistics
[60F05](#) Central limit and other weak theorems
[62F40](#) Bootstrap, jackknife and other resampling methods
[62G30](#) Order statistics; empirical distribution functions
[62F03](#) Parametric hypothesis testing

Cited in **18** Documents

Keywords:

Canadian lynx data set; conditional mean; diagnostic tests; time series; weak convergence; wild bootstrap