Einladung zum Biometrischen Kolloquium

Am 13.3.2017, 11-12h

MUW-CeMSIIS, Spitalgasse 23, 1090 Wien, BT 88, Informatik-Bibliothek 88.03.806

Host: Georg Heinze

ROK BLAGUS

University of Ljubljana, Institute for Biostatistics and Medical Informatics

Visiting researcher at CeMSIIS

CUMULATIVE SUM PROCESSES FOR GOODNESS-OF-FIT TESTING

Linear regression is a fundamental statistical tool for analyzing experimental and observational data for a continuous outcome. Model misspecification seriously affects the validity and efficiency of regression analysis, therefore model checking plays an important role. We review the existing goodness-of-fit tests which are based on the cumulative sum (cumsum) of the model's residuals and propose novel tests. The tests based on cumsum processes formalize and objectify the graphical procedures where the residuals are plotted versus the fitted values where one looks for systematic patterns. The problem when using cumsum processes based on residuals is that they converge to a zero mean Gaussian processes which has a very complex covariance structure, hence the theoretical results which are available for Brownian motion or Brownian bridge processes cannot be applied. We show that using permutations to obtain the p-value can provide a good alternative to the other available procedures, like for example wild bootstrap proposed by Stute et al. (1998) or simulation approach proposed by Su and Wei (1991), which are only asymptotically valid. We show, using an extensive Monte Carlo simulation study, that our proposed tests attain correct size with as few as 10 subjects, while being as powerful as the other available alternatives, which are very liberal with such a small sample size. The results are also illustrated on a real data example.