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Least trimmed squares regression with missing values and cellwise outliers

Regression is the workhorse of statistics, and is often faced with real data that contain outliers. When these are casewise outliers, that is, cases that are entirely wrong or belong to a different population, the issue can be remedied by existing casewise robust regression methods. It is another matter when cellwise outliers occur, that is, suspicious individual entries in the data matrix containing the regressors and the response. We propose a new regression method that is robust to both casewise and cellwise outliers, and handles missing values as well. Its construction allows for skewed distributions. We show that it obeys the first breakdown result for cellwise robust regression. It is also the first such method that is geared to making robust out-of-sample predictions. Its performance is studied by simulation, and it is illustrated on a substantial real dataset.

Special/ Invited session

Classification

Mainly methodology

Keywords

Casewise outliers; Outlying cells; Prediction; Robust regression; Symmetrization.

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Track Classification: Statistical / Stochastic Modelling and Statistical Computing