Introduction

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While the method of least squares (and its generalizations) have served statisticians well for a good many years (mainly because of mathematical convenience and ease of computation), and enjoys certain well known properties within strictly Gaussian parametric models, it is recognized that outliers, which arise from heavy-tailed distributions, have an unusually large influence on the estimates obtained by these methods. Indeed, one single outlier can have an arbitrary large effect on the estimate. Outlier diagnostics have been developed to detect observations with a large influence on the least squares estimation. For excellent books related to such diagnostics the reader is referred to Cook and Weisberg (1982, 1994) and Chatterjee and Hadi (1988).

Parallel to diagnostic techniques, robust methods with varying degrees of robustness and computational complexity have been developed to modify the LS method so that the outliers have less influence on the final estimates. Among others are the bounded influence estimators, the repeated median, the least median of squares and the regression quantile methods.

In 1964, Huber published what is now considered to be a classic paper on robust estimation of location parameter and subsequently extended to that linear model. The development of selected robustness concepts since their inception in the 1960's and their current status, is given by Huber (1995).

One of the simplest robust alternatives to LS is the least absolute value method. This method, which is the subject of this volume, is a widely recognized superior method especially well-suited to longer-tailed error distributions, such as the Laplace distribution.

Depending on the field of application, the least absolute value method has been studied in several contexts under a variety of names such as minimum, or least sums of absolute errors, deviations or values; and here we