

Uniform asymptotics for S- and MM-regression estimators

Marek Omelka · Matías Salibián-Barrera

Received: 16 January 2008 / Revised: 7 May 2008 / Published online: 6 September 2008
© The Institute of Statistical Mathematics, Tokyo 2008

Abstract In this paper we find verifiable regularity conditions to ensure that S-estimators of scale and regression and MM-estimators of regression are uniformly consistent and uniformly asymptotically normally distributed over contamination neighbourhoods. Moreover, we show how to calculate the size of these neighbourhoods. In particular, we find that, for MM-estimators computed with Tukey's family of bisquare score functions, there is a trade-off between the size of these neighbourhoods and both the breakdown point of the S-estimators and the leverage of the contamination that is allowed in the neighbourhood. These results extend previous work of Salibián-Barrera and Zamar for location-scale to the linear regression model.

Keywords Robustness · Robust inference · Uniform asymptotics · Robust regression