

Wild bootstrap for M estimators of linear regression

Xuming He

Department of Statistics

University of Illinois at Urbana-Champaign

x-he@uiuc.edu

Abstract

The wild bootstrap method is capable of accounting for heteroscedasticity in a regression model. However, the existing theory has focused on the wild bootstrap for linear estimators. In this note, we give the conditions of the class of weight distributions that yield asymptotically valid wild bootstrap variance estimates for M estimators of linear regression, including the least absolute deviation estimator and regression quantile estimators. It is interesting to note that most weight distributions used in the existing wild bootstrap literature lead to biased variance estimates for nonlinear estimators of linear regression. A simulation study is carried out to compare various bootstrap methods and to demonstrate the relevance of our work in finite-sample problems. The wild bootstrap is a preferred re-sampling method to account for general forms of heteroscedasticity in a regression model with fixed design points. This presentation is based on joint work with Xingdong Feng and Jianhua Hu.