ASYMPTOTICS OF THE THEIL-SEN ESTIMATOR IN SIMPLE LINEAR REGRESSION MODEL WITH A RANDOM COVARIATE

Dr. Xueqin Wang
Department of Mathematics
University of Mississippi

We consider a simple linear regression model. The Theil-Sen estimator is a point estimator of the slope parameter in the model and has many nice properties, including asymptotic normality. Thus it has been introduced in several classical textbooks on nonparametric statistics. Most of its properties are established under the assumptions that the error distribution is absolutely continuous and the covariate is not random. In this paper we study asymptotic properties of the Theil-Sen estimator in a simple linear regression model with a random covariate and an arbitrary error distribution, which may not be continuous. We show that it is strongly consistent and has an asymptotic distribution, which may not be a normal distribution if the error distribution is not absolutely continuous.