

## **Two-step robust estimator in heteroscedastic regression model in the presence of outliers**

### **ABSTRACT**

Although the ordinary least squares (OLS) estimates are unbiased in the presence of heteroscedasticity, these are no longer efficient. This problem becomes more complicated when the violation of constant error variances comes together with the existence of outliers. The weighted least squares (WLS) procedure is often used to estimate the regression parameters when heteroscedasticity occurs in the data. But there is evidence that the WLS estimators suffer a huge set back in the presence of outliers. Moreover, the use of the WLS requires a known form of the heteroscedastic errors structures. To rectify this problem, we proposed a new method that we call two step robust weighted least squares (TSRWLS) method where prior information on the structure of the heteroscedastic errors is not required. In the proposed procedure, the robust technique is used twice. Firstly, the robust weights are used for solving the heteroscedastic error and secondly, the robust weighting function is used for eliminating the effect of outliers. The performance of the newly proposed estimator is investigated extensively by real data sets and Monte Carlo simulations.

**Keyword:** Heteroscedasticity; Monte Carlo simulation; Outliers; Two-step robust weighted least squares; Weighted least squares