FUZZY WEIGHTED SCALED COEFFICIENTS IN SEMI-PARAMETRIC MODEL

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Abstract. In general, the regressor variables are stochastic, Duan and Li (1987, *J. Econometrics*, **35**, 25–35), Li and Duan (1989, *Ann. Statist.*, **17**, 1009–1052) have been shown that under very general design conditions, the least squares method can still be useful in estimating the scaled regression coefficients of the semi-parametric model $Y_i = Q_1(\alpha + \beta X_i; \epsilon_i)$, $i = 1, 2, \ldots, n$. Here α is a constant, β is a $1 \times p$ row vector, X_i is a $p \times 1$ column vector of explanatory variables, ϵ_i is an unobserved random error and Q_1 is an arbitrary unknown function. When the data set (X_i, Y_i), $i = 1, 2, \ldots, n$, contains one or several outliers, the least squares method can not provide a consistent estimator of the scaled coefficients β. Therefore, we suggest the "fuzzy" weighted least squares method to estimate the scaled coefficients β for the data set with one or several outliers. It will be shown that the proposed "fuzzy" weighted least squares estimators are $\sqrt{n}$-consistent and asymptotically normal under very general design condition. Consistent measurement of the precision for the estimator is also given. Moreover, a limited Monte Carlo simulation and an example are used to study the practical performance of the procedures.

Key words and phrases: Least squares estimator, semi-parametric model, outlier, asymptotic normality, fuzzy weighted least squares estimator, Monte Carlo simulation.