

## **Weighting Games in Robust Linear Regression**

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Abstract:

In a number of problems, interest is centered on only a few of the coefficients of the multiple linear regression model, while the remaining parameters are treated as nuisance parameters. At the same time, the experimenter is interested in estimating the parameters robustly. We propose a new weighting scheme which generates estimators for the parameters of interest that are more efficient than their bounded influence counterparts. The new weighting scheme differentially downweights the components of the explanatory variables and produces the estimators as solutions of a set of estimating equations. Moreover, the differential downweighting allows us to maintain a bound on a selected sensitivity while increasing the efficiency of the subvector of parameters of interest. We study the covariance structure of the new estimators and derive conditions which guide us in the weight construction.