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OPTIMAL MINIMAX RANDOM DESIGNS FOR WEIGHTED LEAST SQUARES ESTIMATORS

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HOST: Martin Posch

ABSTRACT

Consider an experimental design problem where the values of a predictor variable, denoted by x , are to be determined with the goal of estimating a function $m(x)$, which is observed with noise. A linear model is fitted to $m(x)$ but it is not assumed that the model is correctly specified. It follows that the quantity of interest is the best linear approximation of $m(x)$, which is denoted by $l(x)$. It is shown that in this framework the ordinary least squares estimator typically leads to an inconsistent estimation of $l(x)$, and rather weighted least squares should be considered. An asymptotic minimax criterion is formulated for this estimator, and a design that minimizes the criterion is presented. The results are illustrated for polynomial regression models and the general case is also discussed.