OPTIMAL DESIGNS WITH RESPECT TO ELFVING'S PARTIAL MINIMAX CRITERION IN POLYNOMIAL REGRESSION

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Abstract. For the polynomial regression model on the interval $[a, b]$ the optimal design problem with respect to Elfving's minimax criterion is considered. It is shown that the minimax problem is related to the problem of determining optimal designs for the estimation of the individual parameters. Sufficient conditions are given guaranteeing that an optimal design for an individual parameter in the polynomial regression is also minimax optimal for a subset of the parameters. The results are applied to polynomial regression on symmetric intervals $[-b, b]$ $(b \leq 1)$ and on nonnegative or nonpositive intervals where the conditions reduce to very simple inequalities, involving the degree of the underlying regression and the index of the maximum of the absolute coefficients of the Chebyshev polynomial of the first kind on the given interval. In the most cases the minimax optimal design can be found explicitly.

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