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A delimitation of the support of optimal designs for Kiefer's ϕ_p-class of criteria

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The paper extends the result of Harman and Pronzato [Stat. & Prob. Lett., 77:90--94, 2007], which corresponds to $p=0$, to all strictly concave criteria in Kiefer's ϕ_p-class. Let ξ be any design on a compact set $X\subset\mathbb{R}^m$ with a nonsingular information matrix $\Mb(\xi)$, and let δ be the maximum of the directional derivative $F_{\phi_p}(\xi,x)$ over all $x\in X$. We show that any support point x_* of a ϕ_p-optimal design satisfies the inequality $F_{\phi_p}(\xi,x_*) \geq h_p[\Mb(\xi),\delta]$, where the bound $h_p[\Mb(\xi),\delta]$ is easily computed: it requires the determination of the unique root of a simple univariate equation (polynomial when p is integer) in a given interval. The construction can be used to accelerate algorithms for ϕ_p-optimal design and is illustrated on an example with A-optimal design.

Subjects: **Statistics Theory (math.ST)**

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