

On construction of optimal mixed-level supersaturated designs

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(Submitted on 19 May 2011)

Supersaturated design (SSD) has received much recent interest because of its potential in factor screening experiments. In this paper, we provide equivalent conditions for two columns to be fully aliased and consequently propose methods for constructing $E(f_{\{\mathbf{NOD}\}})$ - and χ^2 -optimal mixed-level SSDs without fully aliased columns, via equidistant designs and difference matrices. The methods can be easily performed and many new optimal mixed-level SSDs have been obtained. Furthermore, it is proved that the nonorthogonality between columns of the resulting design is well controlled by the source designs. A rather complete list of newly generated optimal mixed-level SSDs are tabulated for practical use.

Comments: Published in at [this http URL](#) the Annals of Statistics ([this http URL](#)) by the Institute of Mathematical Statistics ([this http URL](#))

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

Journal reference: Annals of Statistics 2011, Vol. 39, No. 2, 1310-1333

DOI: [10.1214/11-AOS877](#)

Report number: IMS-AOS-AOS877

Cite as: [arXiv:1105.3816](#) [math.ST]
(or [arXiv:1105.3816v1](#) [math.ST] for this version)

Submission history

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[v1] Thu, 19 May 2011 08:58:14 GMT (47kb)

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