



# A trigonometric approach to quaternary code designs with application to one-eighth and one-sixteenth fractions

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(Submitted on 13 May 2011)

The study of good nonregular fractional factorial designs has received significant attention over the last two decades. Recent research indicates that designs constructed from quaternary codes (QC) are very promising in this regard. The present paper shows how a trigonometric approach can facilitate a systematic understanding of such QC designs and lead to new theoretical results covering hitherto unexplored situations. We focus attention on one-eighth and one-sixteenth fractions of two-level factorials and show that optimal QC designs often have larger generalized resolution and projectivity than comparable regular designs. Moreover, some of these designs are found to have maximum projectivity among all designs.

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, 931-955

DOI: [10.1214/10-AOS815](#)

Report number: IMS-AOS-AOS815

Cite as: [arXiv:1105.2698 \[math.ST\]](#)  
(or [arXiv:1105.2698v1 \[math.ST\]](#) for this version)

## Submission history

From: Runchu Zhang [[view email](#)]

[v1] Fri, 13 May 2011 12:00:30 GMT (48kb)

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