

1047-62-44

**Thomas Klein\*** (tpklein@ma.tum.de), Zentrum Mathematik, TU München, Boltzmannstr. 3,  
D-85748 Garching, Germany. *Kiefer-complete classes of designs for cubic mixture models.*

Mixture experiments are experiments in which the experimental conditions are relative proportions of ingredients. In a second-degree regression model for such experiments, Draper et al. (2000) found the class of weighted centroid designs to be essentially complete with respect to the Kiefer ordering, a preorder based on the idea of measuring the amount of information on the unknown model parameters. Essential completeness means that for any given design there is a weighted centroid design at least as good as the given design, relative to the Kiefer ordering.

One natural question arising from Draper et al. is whether a similar result can be reproduced for cubic models. Understanding symmetry and Loewner comparability of moment matrices is essential. Andersson's (1975) result on invariant symmetric matrices proves valuable in characterizing Loewner comparability of invariant designs. Further, we classify so-called orbit designs in order to derive design improvement lemmas leading to completeness theorems. Our approach extends Draper et al.'s (2000) results from quadratic to cubic models and provides a more systematic method for identifying complete classes of designs.

(Partly joint work with Steen Andersson, Indiana University) (Received December 18, 2008)