



## Operations Research Seminar

# Alternatives to Resolution IV Screening Designs in 16 Runs

**Douglas C. Montgomery** **Thursday, April 2, 2009**

Professor

Arizona State University

14:50-15:15 Refreshment outside GL-239

15:15-16:15 Seminar at GL-115

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The resolution IV regular fractional factorial designs in 16 runs for six, seven, and eight factors are in standard use. They are economical and provide clear estimates of main effects when three-factor and higher-order interactions are negligible. However, because the two-factor interactions are completely confounded, experimenters are frequently required to augment the original fraction with new runs to resolve ambiguities in interpretation. We identify nonregular orthogonal fractions in 16 runs for these situations that have no complete confounding of two-factor interactions. These designs allow for the unambiguous estimation of models containing both main effects and a few two-factor interactions. We present the rationale behind the selection of these designs from the nonisomorphic 16-run fractions and illustrate how to use them with an example from the literature.

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Dr. Douglas C. Montgomery is Regents' Professor and the ASU Foundation Professor of Engineering at Arizona State University. He holds BSIE, MS and Ph.D. degrees from Virginia Polytechnic Institute. His research and teaching interests are in industrial statistics. He is an author of 11 books and over 200 archival publications. Professor Montgomery is a Fellow of the American Society for Quality, a Fellow of the American Statistical Association, a Fellow of the Royal Statistical Society, a Fellow of the Institute of Industrial Engineers, an Elected Member of the International Statistical Institute, and an Elected Academician of the International Academy for Quality. He received the Deming Lecture award from the American Statistical Association. He is a recipient of the Shewhart Medal, the William G. Hunter Award, the Brumbaugh Award, the Lloyd S. Nelson Award, a two-time recipient of the Shewell Award from the American Society for Quality Control, the George Box Medal from ENBIS, and the Ellis R. Ott Award. He is a past Editor of the *Journal of Quality Technology* and one of the Chief Editors of *Quality and Reliability Engineering International*.