Optimal Experimental Design with R

Dieter Rasch, Jurgen Pilz, L.R. Verdooren and Albrecht Gebhardt. Boca Raton, Florida, Chapman and Hall/CRC. 2011. xiv + 345 pp. $99.95.

The publisher's website (www.crcpress.com/product/isbn/9781439816974) says this book provides guidance on the construction of experiments, including sample size calculations, hypothesis testing, and confidence estimation. However, it's really a manual for the R-program package OPDOE, which, to their credit, is exactly what the authors say in the Preface. (The package is available via a link under the Downloads & Updates tab on the web page referenced above.) Coming as this does under CRC's statistical division, Chapman & Hall, one would expect something that stands up under its weight, rather than being an adjunct to a specific code. Nevertheless, the book provides an impressive amount of information that will be greatly helpful to OPDOE users.

As one would expect from a user guide, the book provides many examples, mainly from the fields of agriculture and animal science. Those looking for inspiration for industrial experiments might be put off by the data on worms caught eating potatoes and wither heights for cows. Here again, though, the authors cannot be faulted for writing about their fields of knowledge. Also, design of experiments (DOE) started with applications like this before migrating to manufacturing and, of course, remains vital to further developments.

The authors provide some theoretical background for optimal design, which can only be commended. However, for a good primer on these tools we highly recommend the book by Goos and Jones instead.

For a breakdown of what to expect from all three parts of this book, see the referenced review by Gromping. It provides over a dozen links to R projects for experimenters such as one with useful functions for the second edition of the classic textbook by Box, Hunter and Hunter.

This is a decent effort as a first-edition software manual. The next revision should fill in more details on the one hand and provide better overviewing on the other. As it stands now, readers will benefit from learning about a number of nifty functions in OPDOE, for example its sample size solvers. A few nuggets like this may very well pay for the price of the book.

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REFERENCES

Goos, Peter and Jones, Bradley (2011), *Optimal Design of Experiments: A Case Study Approach*, New York, Wiley.

Gromping, Ulrike (October 2011), *Journal of Statistical Software*, Volume 43, Book Review 5, posted at www.jstatsoft.org/v43/b05/paper.

Box, George; Hunter, J. Stuart and Hunter, William, (2005) *Statistics for Experimenters: Design, Innovation, and Discovery , 2nd Edition*, New York, Wiley-Interscience.