

1. Record Nr.	UNINA9910798565703321
Autore	Goos Peter
Titolo	Optimal Design of Experiments [[electronic resource] ] : A Case Study Approach
Pubbl/distr/stampa	Hoboken, : Wiley, 2011
ISBN	1-119-97616-2
Descrizione fisica	1 online resource (305 p.)
Altri autori (Persone)	JonesBradley
Disciplina	670.285
Soggetti	Experimental design -- Data processing Industrial engineering -- Case studies Industrial engineering -- Experiments -- Computer-aided design
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di contenuto	Optimal Design of Experiments : A Case Study Approach; Contents; Preface; Acknowledgments; 1 A simple comparative experiment; 1.1 Key concepts; 1.2 The setup of a comparative experiment; 1.3 Summary; 2 An optimal screening experiment; 2.1 Key concepts; 2.2 Case: an extraction experiment; 2.2.1 Problem and design; 2.2.2 Data analysis; 2.3 Peek into the black box; 2.3.1 Main-effects models; 2.3.2 Models with two-factor interaction effects; 2.3.3 Factor scaling; 2.3.4 Ordinary least squares estimation; 2.3.5 Significance tests and statistical power calculations; 2.3.6 Variance inflation 2.3.7 Aliasing 2.3.8 Optimal design; 2.3.9 Generating optimal experimental designs; 2.3.10 The extraction experiment revisited; 2.3.11 Principles of successful screening: sparsity, hierarchy, and heredity; 2.4 Background reading; 2.4.1 Screening; 2.4.2 Algorithms for finding optimal designs; 2.5 Summary; 3 Adding runs to a screening experiment; 3.1 Key concepts; 3.2 Case: an augmented extraction experiment; 3.2.1 Problem and design; 3.2.2 Data analysis; 3.3 Peek into the black box; 3.3.1 Optimal selection of a follow-up design; 3.3.2 Design construction algorithm; 3.3.3 Foldover designs 3.4 Background reading 3.5 Summary; 4 A response surface design with a categorical factor; 4.1 Key concepts; 4.2 Case: a robust and optimal process experiment; 4.2.1 Problem and design; 4.2.2 Data analysis; 4.3 Peek into the black box; 4.3.1 Quadratic effects; 4.3.2 Dummy

variables for multilevel categorical factors; 4.3.3 Computing D-efficiencies; 4.3.4 Constructing Fraction of Design Space plots; 4.3.5 Calculating the average relative variance of prediction; 4.3.6 Computing I-efficiencies; 4.3.7 Ensuring the validity of inference based on ordinary least squares; 4.3.8 Design regions  
4.4 Background reading  
4.5 Summary; 5 A response surface design in an irregularly shaped design region; 5.1 Key concepts; 5.2 Case: the yield maximization experiment; 5.2.1 Problem and design; 5.2.2 Data analysis; 5.3 Peek into the black box; 5.3.1 Cubic factor effects; 5.3.2 Lack-of-fit test; 5.3.3 Incorporating factor constraints in the design construction algorithm; 5.4 Background reading; 5.5 Summary; 6 A "mixture" experiment with process variables; 6.1 Key concepts; 6.2 Case: the rolling mill experiment; 6.2.1 Problem and design; 6.2.2 Data analysis; 6.3 Peek into the black box  
6.3.1 The mixture constraint  
6.3.2 The effect of the mixture constraint on the model; 6.3.3 Commonly used models for data from mixture experiments; 6.3.4 Optimal designs for mixture experiments; 6.3.5 Design construction algorithms for mixture experiments; 6.4 Background reading; 6.5 Summary; 7 A response surface design in blocks; 7.1 Key concepts; 7.2 Case: the pastry dough experiment; 7.2.1 Problem and design; 7.2.2 Data analysis; 7.3 Peek into the black box; 7.3.1 Model; 7.3.2 Generalized least squares estimation; 7.3.3 Estimation of variance components; 7.3.4 Significance tests  
7.3.5 Optimal design of blocked experiments

---

## Sommario/riassunto

*"This is an engaging and informative book on the modern practice of experimental design. The authors' writing style is entertaining, the consulting dialogs are extremely enjoyable, and the technical material is presented brilliantly but not overwhelmingly. The book is a joy to read. Everyone who practices or teaches DOE should read this book."* -  
**Douglas C. Montgomery**, **Regents Professor,**  
**Department of Industrial Engineering, Arizona State University**  
*"It's been said: 'Design for the experiment, don't experiment for the design.' This book ably demonstrates this notion*

---