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Nota di contenuto	Design of Experiments in Chemical Engineering; Contents; Preface; I Introduction to Statistics for Engineers; 1.1 The Simplest Discrete and Continuous Distributions; 1.1.1 Discrete Distributions; 1.1.2 Continuous Distribution; 1.1.3 Normal Distributions; 1.2 Statistical Inference; 1.2.1 Statistical Hypotheses; 1.3 Statistical Estimation; 1.3.1 Point Estimates; 1.3.2 Interval Estimates; 1.3.3 Control Charts; 1.3.4 Control of Type II error-; 1.3.5 Sequential Tests; 1.4 Tests and Estimates on Statistical Variance; 1.5 Analysis of Variance; 1.6 Regression analysis; 1.6.1 Simple Linear Regression 1.6.2 Multiple Regression1.6.3 Polynomial Regression; 1.6.4 Nonlinear Regression; 1.7 Correlation Analysis; 1.7.1 Correlation in Linear Regression; 1.7.2 Correlation in Multiple Linear Regression; II Design and Analysis of Experiments; 2.0 Introduction to Design of Experiments (DOE); 2.1 Preliminary Examination of Subject of Research; 2.1.1 Defining Research Problem; 2.1.2 Selection of the Responses; 2.1.3 Selection of Factors, Levels and Basic Level; 2.1.4 Measuring Errors of

Factors and Responses; 2.2 Screening Experiments; 2.2.1 Preliminary Ranking of the Factors
 2.2.2 Active Screening Experiment-Method of Random Balance
 2.2.3 Active Screening Experiment Plackett-Burman Designs; 2.2.3 Completely Randomized Block Design; 2.2.4 Latin Squares; 2.2.5 Graeco-Latin Square; 2.2.6 Youdens Squares; 2.3 Basic Experiment-Mathematical Modeling; 2.3.1 Full Factorial Experiments and Fractional Factorial Experiments; 2.3.2 Second-order Rotatable Design (Box-Wilson Design); 2.3.3 Orthogonal Second-order Design (Box-Benken Design); 2.3.4 D-optimality, B(k)-designs and Hartley's Second-order Designs; 2.3.5 Conclusion after Obtaining Second-order Model
 2.4 Statistical Analysis
 2.4.1 Determination of Experimental Error; 2.4.2 Significance of the Regression Coefficients; 2.4.3 Lack of Fit of Regression Models; 2.5 Experimental Optimization of Research Subject; 2.5.1 Problem of Optimization; 2.5.2 Gradient Optimization Methods; 2.5.3 Nongradient Methods of Optimization; 2.5.4 Simplex Sum Rotatable Design; 2.6 Canonical Analysis of the Response surface; 2.7 Examples of Complex Optimizations; III Mixture Design "Composition-Property"; 3.1 Screening Design "Composition-Property"; 3.1.1 Simplex Lattice Screening Designs
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 3.2 Simplex Lattice Design; 3.3 Scheffe Simplex Lattice Design; 3.4 Simplex Centroid Design; 3.5 Extreme Vertices Designs; 3.6 D-optimal Designs; 3.7 Draper-Lawrence Design; 3.8 Factorial Experiments with Mixture; 3.9 Full Factorial Combined with Mixture Design-Crossed Design; Appendix; A.1 Answers to Selected Problems; A.2 Tables of Statistical Functions; Index

Sommario/riassunto

While existing books related to DOE are focused either on process or mixture factors or analyze specific tools from DOE science, this text is structured both horizontally and vertically, covering the three most common objectives of any experimental research: * screening designs * mathematical modeling, and * optimization. Written in a simple and lively manner and backed by current chemical product studies from all around the world, the book elucidates basic concepts of statistical methods, experiment design and optimization techniques as applied to chemistry and chemical engineeri