1. Record Nr. UNINA9910780448403321

Autore	Antony Jiju
Titolo	Design of experiments for engineers and scientists [[electronic resource] /] / Jiju Antony
Pubbl/distr/stampa	Oxford, : Butterworth-Heinemann, 2003
ISBN	1-280-96404-9 9786610964048 0-08-046995-7
Descrizione fisica	1 online resource (165 p.)
Disciplina	658.5
Soggetti	Experimental design Research, Industrial
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Cover; Contents; Preface; Acknowledgements; Introduction to industrial experimentation; Introduction; Some fundamental and practical issues in industrial experimentation; Summary; Exercises; References; Fundamentals of Design of Experiments; Introduction; Basic principles of Design of Experiments; Randomization; Replication; Blocking; Degrees of freedom; Confounding; Design resolution; Metrology considerations for industrial designed experiments; Measurement system capability; Some tips for the development of a measurement system Selection of quality characteristics for industrial experimentsExercises; References; Understanding key interactions in processes; Introduction; Alternative method for calculating the two order interaction effect; Synergistic interaction vs antagonistic interaction; Scenario 1; Scenario 2; Summary; Exercises; References; A systematic methodology for Design of Experiments; Introduction; Barriers in the successful application of DOE; A practical methodology for DOE; Planning phase; Designing phase; Conducting phase; Analysing phase; Analytical tools of DOE; Main effects plot; Interactions plots Cube plotsPareto plot of factor effects; Normal Probability Plot of factor effects; Normal Probability Plot of residuals; Response surface plots and regression models; Model building for predicting response function;

Confidence interval for the mean response; Summary; Exercises; References; Screening designs; Introduction; Geometric and non-geometric P-B designs; Summary; Exercises; References; Full factorial designs; Introduction; Example of a 22 full factorial design; Objective 1: Determination of main/interaction effects which influence mean plating thickness
Objective 2: Determination of main/interaction effects which influence variability in plating thicknessObjective 4: How to achieve a target plating thickness of 120 units?; Example of a 23 full factorial design; Objective 1: To identify the significant main/ interaction effects which affect the process yield; Objective 2: To identify the significant main/ interaction effects which affect the variability in process yield; Objective 3: What is the optimal process condition?; Example of a 24 full factorial design; Objective 1: Which of the main/interaction effects affect mean crack length?
Objective 2: Which of the main/interaction effects affect variability in crack length?Objective 3: What is the optimal process condition to minimize mean crack length?; Summary; Exercises; References; Fractional factorial designs; Introduction; Construction of half-fractional factorial designs; Example of a 2(7 4) factorial design 76; An application of 2-level fractional factorial design; Example of a 2(5 - 1) factorial design; Objective 1: To identify the factors which influence the mean free height
Objective 2: To identify the factors which affect variability in the free height of leaf springs

Sommario/riassunto

The tools and technique used in the Design of Experiments (DOE) have been proved successful in meeting the challenge of continuous improvement over the last 15 years. However, research has shown that applications of these techniques in small and medium-sized manufacturing companies are limited due to a lack of statistical knowledge required for their effective implementation. Although many books have been written in this subject, they are mainly by statisticians, for statisticians and not appropriate for engineers.Design of Experiments for Engineers and Scientists overcomes the