519.5 CHE

TABLE OF CONTENTS

PREFACE ix

ABOUT THE AUTHOR xi

CHAPTER 1 **Notations and Definitions** 1
- Use of Subscripts 1
- Definitions of Distributions 2
- Measures of Location, Means and Data Coding 4
- Variability of Data 7
- Types of Distributions 9
- Practice Problems 11

CHAPTER 2 **Confidence Limits and Sample Size** 13
- Confidence Interval 13
- Sample Size and Estimating σ 17
- Probability Chart Paper 24
- Tests of Hypotheses 26
- Outliers and Tolerance Intervals 34
- Practice Problems 39

CHAPTER 3 **Data Scatter and the Use of Control Charts** . . 41
- Control Charts 41
- Cumulative Sum Control Charts 48
- Introduction to Spectral Analysis 50
- Sampling Error 66
- Practice Problems 68

CHAPTER 4 **Analysis of Variance** 71
- Introduction 71
- Procedures for Comparing Means and Variances 71
  - *Two-Sided Comparison of Two Variances* 73
  - *One-Sided Comparison of Two Variances* 78

Comparison of Means 84
Analysis of Variance 88
General Terminology 88
Homogeneity of Variance 89
One-Way Analysis of Variance (ANOVA) 93
Two- and Three-Way ANOVA's 100
Practice Problems 109

CHAPTER 5 **The Correlation Coefficient and Introduction to Spectral Density Analysis 113**
Introduction to Correlation Concepts 113
Correlation Functions and Spectral Density Analysis 118
Practice Problems 126

CHAPTER 6 **Linear Regression and Interactive Models . . . 129**
Introduction 129
Linear Regression 129
Quadratic Models 139
Multiple Regression 142
Performing Regressions on Spreadsheets 149
Practice Problems 158

CHAPTER 7 **Experimental Design and Parameter Estimation 161**
Factorial Designs 161
Factorial Points and Analysis of Interactions 164
Screening Tests and Overall Design 171
Closure and General Comments on Experimental Design 183
Practice Problems 184

APPENDIX A **"DATA-FIT" Program User's Guide 187**
General Description 187
Getting Started 187
Data Files 188
Manual Input 188
Importing a LOTUS 1-2-3 Data File 188
Performing the Regression 189
Options 191
Main Features 191
Other Features 193
Exponential and Power Law Regressions 194
Three-Variable Regression Models 194

APPENDIX B **General Definitions and Miscellaneous Statistical Methods** **197**
Nested Designs **197**
Probit Analysis **199**
Trimming **200**

BIBLIOGRAPHY **201**

SUGGESTED READINGS **203**

INDEX **205**