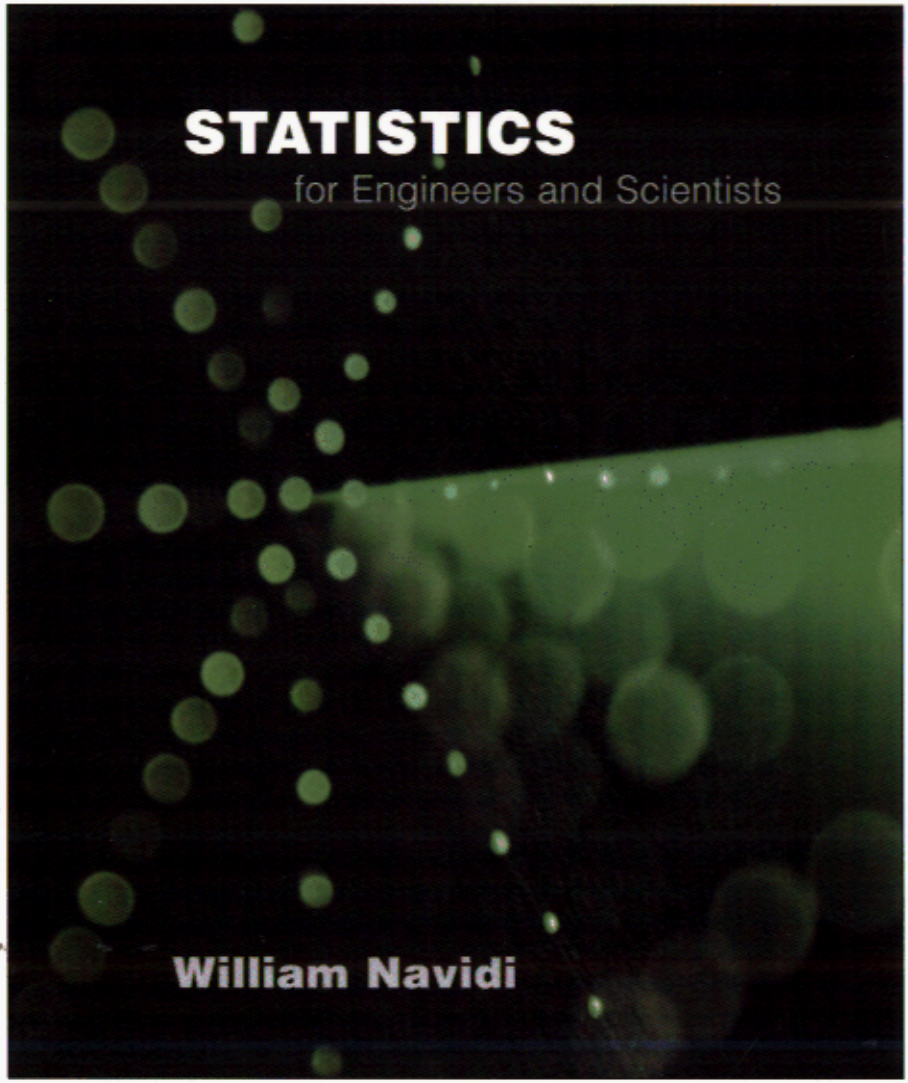

McGRAW-HILL INTERNATIONAL EDITION

CONTENTS

Preface xi

Acknowledgments of Reviewers and Contributors xv

Key Features xix

Chapter 1
Sampling and Descriptive Statistics 1

Introduction 1

1.1 Sampling 3

1.2 Summary Statistics 13

1.3 Graphical Summaries 25

Chapter 2
Probability 50

Introduction 50

2.1 Basic Ideas 50

2.2 Counting Methods (Optional) 62

2.3 Conditional Probability and Independence 69

2.4 Random Variables 88

2.5 Linear Functions of Random Variables 111

2.6 Jointly Distributed Random Variables (Optional) 120

Chapter 3
Propagation of Error 157

Introduction 157

3.1 Measurement Error 157

3.2 Linear Combinations of Measurements 163

3.3 Uncertainties for Functions of One Measurement 173

3.4 Uncertainties for Functions of Several Measurements 179

Chapter 4
Commonly Used Distributions 192

Introduction 192

4.1 The Bernoulli Distribution 192

4.2 The Binomial Distribution 195

4.3 The Poisson Distribution 206

4.4 Some Other Discrete Distributions 220

4.5 The Normal Distribution 231

4.6 The Lognormal Distribution 244

4.7 The Exponential Distribution 250

4.8 The Gamma and Weibull Distributions 259

4.9 Probability Plots 265

4.10 The Central Limit Theorem 270

4.11 Simulation 281

Chapter 5
Confidence Intervals 300

Introduction 300

5.1 Large-Sample Confidence Intervals for a Population Mean 301

5.2 Confidence Intervals for Proportions 315

5.3 Small-Sample Confidence Intervals for a Population Mean 321

5.4 Confidence Intervals for the Difference Between Two Means 331

5.5 Confidence Intervals for the Difference Between Two Proportions 335

5.6 Small-Sample Confidence Intervals for the Difference Between Two Means 339

5.7 Confidence Intervals with Paired Data 346

5.8 Using Simulation to Construct Confidence Intervals 351

Chapter 6
Hypothesis Testing 368

Introduction 368

6.1 Large-Sample Tests for a Population Mean 368

6.2 Drawing Conclusions from the Results of Hypothesis Tests 377

6.3 Tests for a Population Proportion 385

6.4 Small-Sample Tests for a Population Mean 390

6.5 Large-Sample Tests for the Difference Between Two Means 395

6.6 Tests for the Difference Between Two Proportions 401

6.7 Small-Sample Tests for the Difference Between Two Means 407

6.8 Tests with Paired Data 415

6.9 Distribution-Free Tests 420

6.10 The Chi-Square Test 429

6.11 The F Test for Equality of Variance 439

6.12 Fixed-Level Testing 443

6.13 Power 449

6.14 Multiple Tests 458

6.15 Using Simulation to Perform Hypothesis Tests 462

Chapter 7
Correlation and Simple Linear Regression 475

Introduction 475

7.1 Correlation 475

7.2 The Least-Squares Line 492

7.3 Uncertainties in the Least-Squares Coefficients 508

7.4 Checking Assumptions and Transforming Data 527

Chapter 8
Multiple Regression 556

Introduction 556

8.1 The Multiple Regression Model 556

8.2 Confounding and Collinearity 574

8.3 Model Selection 583

Chapter 9
Factorial Experiments 623

Introduction 623

9.1 One-Factor Experiments 623

9.2 Pairwise Comparisons in One-Factor Experiments 646

9.3 Two-Factor Experiments 659

9.4 Randomized Complete Block Designs 683

9.5 2^p Factorial Experiments 693

Chapter 10
Statistical Quality Control 723

Introduction 723

10.1 Basic Ideas 723

10.2 Control Charts for Variables 726

10.3 Control Charts for Attributes 746
10.4 The CUSUM chart 751
10.5 Process Capability 755

Appendix A: Tables 763

Appendix B: Partial Derivatives 787

Appendix C: Bibliography 789

Answers to Odd-Numbered Exercises 792

Index 859