Principles of Statistics for Engineers and Scientists

Second Edition

William Navidi



CONTENTS

4.1

4.2

4.3

The Binomial Distribution

The Poisson Distribution

The Normal Distribution

Preface vii	
Chapter 1	4.4 The Lognormal Distribution 148
Summarizing Univariate Data 1	4.5 The Exponential Distribution 151
Introduction 1	4.6 Some Other Continuous Distributions 156
1.1 Sampling 31.2 Summary Statistics 11	4.7 Probability Plots 162
1.3 Graphical Summaries 21	4.8 The Central Limit Theorem 166
Chapter 2 Summarizing Bivariate Data 37	Chapter 5 Point and Interval Estimation for a Single Sample 179
Introduction 37	Introduction 179
2.1 The Correlation Coefficient 37	5.1 Point Estimation 180
2.2 The Least-Squares Line 492.3 Features and Limitations of the	5.2 Large-Sample Confidence Intervals for a Population Mean 183
Least-Squares Line 57	5.3 Confidence Intervals for Proportions
Chapter 3	196
Probability 67 Introduction 67	5.4 Small-Sample Confidence Intervals for a Population Mean 202
3.1 Basic Ideas 67	5.5 Prediction Intervals and Tolerance Intervals 211
3.2 Conditional Probability and Independence 75	Chapter 6
3.3 Random Variables 86	Hypothesis Tests for a Single Sample 219
3.4 Functions of Random Variables 107	7 Introduction 219
Chapter 4	6.1 Large-Sample Tests for a Population Mean 219
Commonly Used Distributions 122 Introduction 122	6.2 Drawing Conclusions from the Results of Hypothesis Tests 220



6.4

Mean

122

130

137

of Hypothesis Tests

242

Tests for a Population Proportion

Small-Sample Tests for a Population

vi Contents

6.5 6.6	The Chi-Square Test 248 Fixed-Level Testing 257	Chapter 9 Factorial Experiments 411
	Power 262 Multiple Tests 271 pter 7 rences for Two Samples 278	 Introduction 411 9.1 One-Factor Experiments 411 9.2 Pairwise Comparisons in One-Factor Experiments 430
7.1	Introduction 278 Large-Sample Inferences on the Difference Between Two Population Means 278	 9.3 Two-Factor Experiments 436 9.4 Randomized Complete Block Designs 456 9.5 2^p Factorial Experiments 463
7.2	Inferences on the Difference Between Two Proportions 287	Chapter 10 Statistical Quality Control 492
7.3 7.4 7.5	Small-Sample Inferences on the Difference Between Two Means 295 Inferences Using Paired Data 305 Tests for Variances of Normal Populations 315	Introduction 492 10.1 Basic Ideas 492 10.2 Control Charts for Variables 495 10.3 Control Charts for Attributes 514
	pter 8 rence in Linear Models 325	10.4 The CUSUM Chart 51910.5 Process Capability 522
8.1 8.2 8.3 8.4	Introduction 325 Inferences Using the Least-Squares Coefficients 326 Checking Assumptions 349 Multiple Regression 360 Model Selection 377	Appendix A: Tables 529 Appendix B: Bibliography 552 Answers to Selected Exercises 555 Index 601