Preface			
Not	es or	the Fourth Edition	xvii
1	Intr	roduction	1
	1.1	Some Definitions	1
	1.2	The Development of Biometry	3
	1.3	The Statistical Frame of Mind	5
2	Dat	ta in Biology	9
Corps	2.1	Samples and Populations	9
	2.2	Variables in Biology	11
	2.3	Accuracy and Precision of Data	13
	2.4	Derived Variables	16
	2.5	Frequency Distributions	19
3	Cor	mputers and Data Analysis	33
	3.1	Computers	33
	3.1 3.2	Computers Software	33 35
		19. 10 2일 - 10 2일 1일	
4	3.2	Software	35
4	3.2	Software Efficiency and Economy in Data Processing	35 37
4	3.2 3.3 Des	Software Efficiency and Economy in Data Processing Scriptive Statistics	35 37 39
4	3.2 3.3 Des	Software Efficiency and Economy in Data Processing Scriptive Statistics The Arithmetic Mean	35 37 39 40
4	3.2 3.3 Des 4.1 4.2	Software Efficiency and Economy in Data Processing Scriptive Statistics The Arithmetic Mean Other Means	35 37 39 40 44
4	3.2 3.3 Des 4.1 4.2 4.3	Software Efficiency and Economy in Data Processing Scriptive Statistics The Arithmetic Mean Other Means The Median The Mode Sample Statistics and Parameters	35 37 39 40 44 45
4	3.2 3.3 Des 4.1 4.2 4.3 4.4	Software Efficiency and Economy in Data Processing Scriptive Statistics The Arithmetic Mean Other Means The Median The Mode	35 37 39 40 44 45 47
4	3.2 3.3 Des 4.1 4.2 4.3 4.4 4.5	Software Efficiency and Economy in Data Processing Scriptive Statistics The Arithmetic Mean Other Means The Median The Mode Sample Statistics and Parameters	35 37 39 40 44 45 47 49
4	3.2 3.3 Des 4.1 4.2 4.3 4.4 4.5 4.6	Software Efficiency and Economy in Data Processing Scriptive Statistics The Arithmetic Mean Other Means The Median The Mode Sample Statistics and Parameters The Range	35 37 39 40 44 45 47 49 49

5		oduction to Probability Distributions: omial and Poisson	59
	5.1	Probability, Random Sampling, and Hypothesis Testing	60
	5.2	The Binomial Distribution	68
	5.3	The Poisson Distribution	78
	5.4	Other Discrete Probability Distributions	87
6	The	Normal Probability Distribution	93
	6.1	Frequency Distributions of Continuous Variables	93
	6.2	Properties of the Normal Distribution	95
	6.3	A Model for the Normal Distribution	100
	6.4	Applications of the Normal Distribution	102
	6.5	Fitting a Normal Distribution to Observed Data	104
	6.6	Skewness and Kurtosis	106
	6.7	Graphic Methods	108
	6.8	Other Continuous Distributions	117
7	Нур	othesis Testing and Interval Estimation	119
	7.1	Introduction to Hypothesis Testing: Randomization Approaches	120
	7.2	Distribution and Variance of Means	131
	7.3	Distribution and Variance of Other Statistics	137
	7.4	The <i>t</i> -Distribution	140
	7.5	More on Hypothesis Testing: Normally Distributed Data	142
	7.6	Power of a Test	146
	7.7	Tests of Simple Hypotheses Using the Normal and t-Distributions	148
	7.8	The Chi-Square Distribution	154
	7.9	Testing the Hypothesis H_0 : $\sigma^2 = \sigma_0^2$	156
	7.10	Introduction to Interval Estimation (Confidence Limits)	157
	7.11	Confidence Limits Using Sample Standard Deviations	162
	7.12	Confidence Limits for Variances	167
	7.13	The Jackknife and the Bootstrap	168
8	Intr	oduction to Analysis of Variance	177
	8.1	Variances of Samples and Their Means	178
	8.2	The F-Distribution	182
	8.3	The Hypothesis H_0 : $\sigma_1^2 = \sigma_2^2$	187
	8.4	Heterogeneity Among Sample Means	190
	8.5	Partitioning the Total Sum of Squares	
		and Degrees of Freedom	197

	8.6	Model I Anova	200
	8.7	Model II Anova	203
9	Sing	le-Classification Analysis of Variance	207
422	9.1	Computational Formulas	208
	9.2	General Case: Unequal and Equal n	208
	9.3	Special Case: Two Groups	220
	9.4	Comparisons Among Means in a Model I Anova: Essential Background	228
	9.5	Comparisons Among Means: Special Methods	246
10	Nes	ted Analysis of Variance	277
ÜRĀ	10.1	Nested Anova: Design	277
	10.2	Nested Anova: Computation	280
	10.3	Nested Anovas with Unequal Sample Sizes	301
11	Two	-Way and Multiway Analysis of Variance	319
	11.1	Two-Way Anova: Design	319
	11.2	Two-Way Anova with Equal Replication: Computation	321
	11.3	Two-Way Anova: Hypothesis Testing	331
	11.4	Two-Way Anova Without Replication	340
	11.5	Paired Comparisons	349
	11.6	The Factorial Design	354
	11.7	A Three-Way Factorial Design	355
	11.8	Higher-Order Factorial Anovas	365
	11.9	Other Designs	370
	11.10	Anova by Computer	372
12	2 Statistical Power and Sample Size in the		
	Analysis of Variance		379
	12.1	Effect Size	379
	12.2	Noncentral t- and F-Distributions and Confidence Limits for Effect Sizes	382
	12.3	Power in an Anova	390
	12.4	Sample Size in an Anova	391
	12.5	Minimum Detectable Difference	395
	12.6	Post Hoc Power Analysis	396
	12.7	Optimal Allocation of Resources in a Nested Design	397
	12.8	Randomized Blocks and Other Two-Way and Multiway Designs	406

13	Assumptions of Analysis of Variance		409
	13.1	A Fundamental Assumption	410
	13.2	Independence	410
	13.3	Homogeneity of Variances	413
	13.4	Normality	422
	13.5	Transformations	426
	13.6	The Logarithmic Transformation	427
	13.7	The Square Root Transformation	433
	13.8	The Box-Cox Transformation	435
	13.9	The Arcsine Transformation	438
	13.10	Nonparametric Methods in Lieu of Single-Classification	
		Anova	440
	13.11	Nonparametric Methods in Lieu of Two-Way Anova	460
14	Line	ear Regression	471
	14.1	Introduction to Regression	472
	14.2	Models in Regression	475
	14.3	The Linear Regression Equation	477
	14.4	Hypothesis Testing in Regression	485
	14.5	More Than One Value of Y for Each Value of X	495
	14.6	The Uses of Regression	506
	14.7	Estimating X From Y	511
	14.8	Comparing Two Regression Lines	513
	14.9	Linear Comparisons in Anovas	515
	14.10	Examining Residuals and Transformations in Regression	524
	14.11	Nonparametric Tests for Regression	532
	14.12	Model II Regression	535
	14.13	Effect Size, Power, and Sample Size in Regression	544
15	Cor	relation	551
	15.1	Correlation Versus Regression	551
	15.2	The Product-Moment Correlation Coefficient	554
	15.3	Computing the Product-Moment Correlation Coefficient	562
	15.4	The Variance of Sums and Differences	565
	15.5	Hypothesis Tests for Correlations	567
	15.6	Applications of Correlation	577
	15.7	Nonparametric Tests for Association	580
	15.8	Major Axes and Confidence Regions	588
	15.9	Effect Size, Power, and Sample Size	592

16	Mul	tiple and Curvilinear Regression	603
	16.1	Multiple Regression: Computation	604
	16.2	Multiple Regression: Hypothesis Tests	614
	16.3	Path Analysis and Structural Equation Modeling	625
	16.4	Partial and Multiple Correlation	644
	16.5	Selection of Independent Variables	649
	16.6	Computation of Multiple Regression by Matrix Methods	656
	16.7	Solving Anovas as Regression Problems:	
	110	General Linear Models	659
	16.8	Analysis of Covariance (Ancova)	665
		Curvilinear Regression	671
		Effect Size, Power, and Sample Size in Multiple Regression	685
	16.11	Advanced Topics in Regression and Correlation	694
17	Ana	lysis of Frequencies	703
	17.1	Introduction to Tests for Goodness of Fit	704
	17.2	Single-Classification Tests for Goodness of Fit	714
	17.3	Replicated Tests of Goodness of Fit	730
	17.4	Tests of Independence: Two-Way Tables	739
	17.5	Analysis of Three-Way Tables	758
	17.6	Analysis of Proportions	773
	17.7	Randomized Blocks for Frequency Data	793
	17.8	Effect Sizes, Power, and Sample Sizes	801
18	Met	a-Analysis and Miscellaneous Methods	817
	18.1	Synthesis of Prior Research Results: Meta-Analysis	817
	18.2	Tests for Randomness of Nominal Data: Runs Tests	841
	18.3	Isotonic Regression	847
	18.4	Application of Randomization Tests to Unconventional Statistics	850
	18.5	The Mantel Test of Association Between Two Distance Matrices	852
	18.6	The Future of Biometry: Data Analysis	859
Арр	endic	ces	
Α	. Mat	thematical Proofs	869
В	. Intro	oduction to Matrices	885
Bibli	iograp	le la multicate and traduct up ability as these elements in the leaders	891
Autl	hor In	dex	909
Subj	Subject Index		