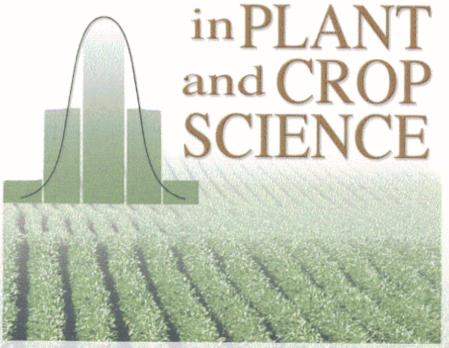
HANDBOOK of STATISTICS

forTEACHING and RESEARCH



USHA RANI PALANISWAMY KODIVERI MUNIYAPPA PALANISWAMY

CONTENTS

Foreword C. Ramasamy	xiii
Preface	xv
Acknowledgments	xix
Introduction	xxi
PART I: STATISTICAL METHODS	
Chapter 1. Tables, Graphs, and Diagrams	3
Tables	3
Graphs and Diagrams	3
Exercises	28
Chapter 2. Review of Basic Mathematical Concepts	
Fundamental to Statistics	33
Variables	33
Summations	34
Logarithms	34
Squares and Square Roots	36
Quantities	37
Permutation and Combinations	38
Exercises	40
Chapter 3. Nature of Statistical Data	41
Raw Data	41
Classification of Data	41
Exercises	42
Chapter 4. Measures of Central Tendency	43
Mean	43
Median	56
Mode	58
Exercises	68

Chapter 5. Measures of Dispersion	73
Variables	73
Most Common Measures of Dispersion	74
Exercises	94
Chapter 6. Normal Distribution	99
Properties of Normal Distribution	100
Properties of Standard Normal Distribution	105
Probability Integral	110
Practical Application Examples	114
Exercises	114
Chapter 7. Probability	119
Experiments	119
Basic Concepts of Probability	121
Exercises	124
Chapter 8. Set Theory	125
Sample Spaces	125
Venn Diagrams	126
Expected Value	128
Exercises	129
Chapter 9. Special Techniques in Descriptive Statistics	131
Frequency Distribution	131
Discrete Variables	136
Exercises	147
Chapter 10. Population, Sample, and Statistical Inference	153
Population	153
Sample	154
Parameters and Statistics	154
Sample Size and Sampling Distribution of Mean	
and Variance	157
Some Points	159
Standard Error	162
Exercises	167

Chapter 11. Hypothesis and Test of Significance	169
Null Hypothesis	169
Test of Hypothesis	171
Level of Significance	172
Interpolation	174
Testing of a Population Mean	174
Significance of Asterisks	194
Exercises	203
Chapter 12. Correlation	207
Methods of Studying Correlation	208
Coefficient of Determination	222
Assumptions in Correlation Analysis	224
Rank Correlation	225
Exercises	228
Chapter 13. Regression	233
Function Concept and Regression	233
Straight Line Equation	234
Definition of Error in Regression Estimates	240
Prediction and Measurement of Error in Prediction	244
Exercises	259
Chapter 14. Chi Square Test of Significance	265
Definition	266
Correction for Continuity	268
Test of Goodness of Fit	269
Poisson Distribution	272
Procedure for Fitting Normal Distribution	277
Test of Independence (or Testing for Association)	284
Pearson's Coefficient of Contingency	289
Heterogeneity Chi-Square Analysis	291
Exercises	296
PART II: EXPERIMENTAL DESIGN	
Chapter 15. Experimental Design	305
Experimental Design	30€
Experimental Unit	306

Accuracy Precision Bias Study of Variability Among Plots Treatment Experimental Error	307 307 308 308 310 311
Exercises	320
Chapter 16. Analysis of Variance	329
Fundamental Concepts Computation of Variance Find the F Ratio Value Degrees of Freedom F Distribution Summary of the ANOVA Technique Exercises	329 331 332 332 333 334 335
Chapter 17. Principles of Experimental Design	337
Replication Randomization Local Control Analysis of Data Exercises	337 339 340 342 345
Chapter 18. Completely Randomized Design	347
Description of the Design F Ratio and Its Significance Using the F Table Assumptions Least Significant Difference Computation Procedure for Completely Randomized Design Exercises	347 354 354 355 356 359 367
Chapter 19. Randomized Complete Block Design	375
Two-Way Classification The Specifics of Randomized Complete Block Design Linear Model for Randomized Complete Block Design Missing Values	375 376 384

,	
Modifications in the Analysis Exercises	388 393
Chapter 20. Group Comparisons	399
Comparison Orthogonal and Nonorthogonal Contrasts Partitioning of Treatment Sum of Squares Second Set of Orthogonal Comparisons Practical Utility of Contrasts Exercises	399 400 400 403 404 405
Chapter 21. Multiple Comparison Procedures	407
Least Significant Difference Test Duncan's New Multiple Range Test Dunnett's Test Tukey's w - Procedure Test Newman-Keuhls Test or Student-Newman-Keuhls Test Scheffe's or S Test Exercises	407 411 413 414 416 419 421
Chapter 22. Latin Square Design	425
Linear Model Advantages and Disadvantages of Latin Square Design Latin Square and Trend Analysis Exercises	430 434 437 444
Chapter 23. Factorial Experiments	447
Levels Single-Factor Experiment versus Factorial Experiment Two-Factor Experiments Meaning of Significant Interaction Three-Factor Experiments Exercises	447 451 452 456 461 464
Chapter 24. Split Plot Design	469
Reasons for Adopting Split Plot Design Procedure for Layout of Split Plot Design Comparison of Split Plot Design with RCBD Standard Errors in Split Plot Design Exercises	469 472 473 474 492

Chapter 25. Split Block (Strip Plot)	495
Layout	495
Combined Analysis in Strip Plot Design	501
Exercises	504
Chapter 26. Completely Confounded Design	505
Layout of the Experiment	506
Choice of Confounding Interactions	511
Statistical Analysis	512
Identification of Confounded Interaction	512
Conclusion	514
Exercises	516
Chapter 27. Analysis of Covariance	519
Reasons for Covariance Analysis	520
Uses of Covariance Analysis	520
Principles in ANOCOVA with Reference to Two	
Treatments	521
Comparisons Involving Adjusted Means	527
Testing Homogeneity of Regression	529
Assumptions in Covariance Analysis Exercises	531 532
Chapter 28. Transformation of Experimental Data	535
Transformation	536
Exercises	547
Chapter 29. Quality Control	551
Quality Control and Statistical Quality Control	552
Causes of Variation	552
Stable and Unstable Conditions	553
Mean Chart	555
Quality Control Chart for Range (R chart)	560
P Chart	561
C Chart Exercises	564
Exercises	566
Appendix: Statistical Tables	57 1
Index	605