

CONTENTS

CHAPTER I

STATISTICS AS A SCIENCE : AXIOMS OF PROBABILITY

	PAGE
1. Introductory	1
2. Statistics as a Science	2
3. Survey of Definitions of Probability	5
4. Probability as Measure of a Sub-Aggregate	9
5. Definition of Probability	12
6. Addition and Multiplication Theorems	13
7. Generating Functions of Probability	16
8. Properties of Generating Functions	17
9. Moments and Moment Generating Functions	20
10. Cumulant Generating Functions	22
11. Change of Origin and Scale	23
12. Population and Sample : Notation	24

CHAPTER II

PROBABILITY AND FREQUENCY DISTRIBUTIONS: GRAPHICAL REPRESENTATION : CALCULATION OF MOMENTS

13. Distributions, Probability Curve, Histogram	26
14. Descriptive Parameters of Distribution	29
15. Measures of Dispersion	32
16. Measures of Asymmetry or Skewness	36
17. Measures of Flattening or Excess	38
18. Practical Computation of Moments	39
19. Computation of Moments by Summation	40
20. Sheppard's Corrections for Grouped Moments	44

CHAPTER III

SPECIAL PROBABILITY DISTRIBUTIONS

21. Equal Probability : the Rectangular Distribution	48
22. The Binomial Distribution	49

	PAGE
23. The Binomial Distribution of Poisson	50
24. Bernoullian and Poissonian Variance	51
25. The Lexian Distribution	52
26. Coolidge's Extension of the Lexian Scheme	53
27. Charlier's Criteria of Homogeneity	54
28. Types of Multinomial Distribution	55
29. Sampling without Replacement : Hypergeometric Distribution	56
30. Approximate Distributions : Types A and B	58
31. Normal Function as Limit of Binomial	59
32. Properties of Normal Probability Function	61
33. Poissonian Function of Rare Frequency	63
34. Properties of Poissonian Function	63
35. More General Derivations : Types A and B	64
36. Other Systems : the System of Pearson	67
37. Probability Functions and Change of Variate	69
38. Cauchy's Probability Function	70
39. Pearson Curve of Type I	71

CHAPTER IV

PRACTICAL CURVE FITTING WITH
STANDARD CURVES

40. Representation of Data by Normal Curve	73
41. Representation by Type A	75
42. Representation by Poissonian Function or Type B	76
43. Limitations on Use of Moments	78

CHAPTER V

PROBABILITY AND FREQUENCY IN TWO VARIATES

44. Bivariate Distributions : Correlation and Regression	80
45. Binomial and Hypergeometric Correlation	82
46. Bivariate Moments and Generating Functions	84
47. Normal Correlation as Limit of Binomial Correlation	85
48. Properties of Normal Correlation Function	86
49. Regression Lines in Normal Correlation	88
50. Correlation Table : Computation of Product-Moment	89
51. Correlation of Variates with Poissonian Distribution	94
52. Non-Linear Correlation and Regression	95
53. Computation of Correlation-Ratios	98
54. Correlation of Non-Metrical Characters	99
55. Coefficients of Contingency	104

CHAPTER VI

THE METHOD OF LEAST SQUARES : MULTIVARIATE
CORRELATION: POLYNOMIAL AND HARMONIC
REGRESSION

	PAGE
56. Multivariate Regression	106
57. Method of Least Squares	106
58. Precision, Weight, Errors and Residuals	107
59. Repeated Measurements of a Single Unknown	108
60. Indirect Determinations from Linear Equations	109
61. Application of Least Squares to Trivariate Correlation	111
62. Partial Correlation	113
63. Non-Linear Regression : Polynomial Regression	114
64. Practical Routine of Fitting a Polynomial	116
65. Periodic Regressions : Case of Equal Weights	120
66. Practical Solution of the Normal Equations	121
67. General Regressions	123

CHAPTER VII

PROBABILITY DISTRIBUTIONS OF STATISTICAL
COEFFICIENTS

68. Sampling Distributions	125
69. Sampling Distribution of Means	127
70. Distribution of Mean Square in Normal Sample	129
71. Distributions of Estimate of Variance	130
72. " Student's Ratio " and its Distribution	131
73. Difference of Means of Normal Samples	134
74. Ratio of Variates of Same χ^2 Type	135
75. Analysis of Variance and Sum of Squares	136
76. Analysis into Two Components and Residual	138
77. The Latin Square	139
78. Conclusion	142
79. Problem of Estimation of Parameters from Sample	143
80. Table of Normal Probability Integral	144

APPENDIX

1. Finite Differences and Factorial Polynomials	145
2. Finite Sums	146
3. Relations between Powers and Factorials	147
4. Tables of Probability Integral and Poisson Function	147
5. Linear and Functional Dependence, Correlation, Statistical Dependence	148
Index	149