

Contents

I. UNIFORM DISTRIBUTION OVER THE SPACE OF PERMUTATIONS	1
1. Permutations	3
2. Uniform distribution over the space of permutations	5
3. The distribution of statistics $\sum_{i=1}^N c_i a(R_i)$	6
4. Approximate normality of linear statistics	12
Problems and complements	16
II. HYPOTHESIS OF RANDOMNESS	18
5. Hypotheses \bar{H}_0 and H_0 , ranks	18
6. Rank tests for H_0	23
7. Stochastic ordering	31
Problems and complements	38
III. TESTING RANDOMNESS AGAINST TWO SAMPLES DIFFERING IN LOCATION	40
8. Statement of the alternative	40
9. The test statistics	44
10. The Wilcoxon test	52
11. The median test	56
12. The van der Waerden test	60
13. The Kolmogorov-Smirnov test	62
14. A test based on exceedances	66
15. Numerical examples	69
Problems and complements	79

IV. TESTING RANDOMNESS AGAINST OTHER TYPES OF ALTERNATIVES	82
16. Two samples differing in scale (dispersion)	82
17. Regression alternatives for location	93
18. The case of k samples ($k \geq 3$)	96
Problems and complements	101
V. THE HYPOTHESES OF SYMMETRY AND OF RANDOM BLOCKS	102
19. Basic concepts and theorems	102
20. The sign test	107
21. The one-sample Wilcoxon test	108
22. Paired samples	109
23. Random blocks	112
Problems and complements	113
VI. THE HYPOTHESES OF INDEPENDENCE	115
24. Definitions and basic theorems	115
25. The Spearman test	119
26. The quadrant test	120
27. The Kendall rank correlation coefficient	122
28. Numerical example	123
Problems and complements	125
VII. TIES	127
29. Ties in testing randomness	127
30. Ties in testing symmetry	135
31. Ties in testing independence	136
32. Numerical examples	137
Problems and complements	144
VIII. SOURCES OF POWER	146
33. Approximate power in testing H_0	146
34. Choice of the scores	150
35. Choice of the linear model	152
36. Approximate efficiency	155
Problems and complements	156
TABLES I - XVIII	158
BIBLIOGRAPHY	179
INDEX	183