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THE NIST STATISTICAL TEST SUITE

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1. FREQUENCY TEST

Computational information:

- (a) The nth partial sum = -170
- (b) S_n/n = -0.000170

p_value = 0.865010, SUCCESS

2. BLOCK FREQUENCY TEST

Computational information:

- (a) χ^2 = 125574.500000
- (b) # of substrings = 125000
- (c) block length = 8

p_value = 0.125365, SUCCESS

3. CUMULATIVE SUMS TEST

Cumulative sums forward test:

Computational information:

- (a) The maximum partial sum =

p_value = 0.984758, SUCCESS

Cumulative sums reverse test:

Computational information:

- (a) The maximum partial sum =

p_value = 0.967477, SUCCESS

4. RUNS TEST

Computational information:

- (a) P_i = 0.499915
- (b) V_{n_obs} (Total # of runs) = 499811

$$\frac{(c) \sqrt{V_{n_obs} - 2 n p_i (1-p_i)}}{2 \sqrt{2n} p_i (1-p_i)} = 0.267266$$

p_value = 0.705452, SUCCESS

5. LONGEST RUNS OF ONES TEST

Computational information:

(a) N (# of substrings) = 100
 (b) M (Substring Length) = 10000
 (c) Chi^2 = 3.980266

Frequency

<=10	11	12	13	14	15	>=16
12	19	19	22	11	9	8

p_value = 0.679347, SUCCESS

6. RANK TEST

Computational information:

(a) Probability P_32 = 0.288788
 (b) P_31 = 0.577576
 (c) P_30 = 0.133636
 (d) Frequency F_32 = 296
 (e) F_31 = 548
 (f) F_30 = 132
 (g) # of matrices = 976
 (h) Chi^2 = 1.166644
 (i) NOTE: 576 BITS WERE DISCARDED.

p_value = 0.558041, SUCCESS

7. DFT TEST

Computational information:

(a) Percentile = 95.010200
 (b) N_l = 475051.000000
 (c) N_o = 475000.000000
 (d) d = 0.330932

p_value = 0.740696, SUCCESS

8. NONOVERLAPPING TEMPLATES TEST

Computational information:
LAMBDA = 122.061523
M = 125000, N = 8, m = 10, n = 1000000

Template	W_1	W_2	W_3	W_4	W_5	W_6	W_7	W_8
1100100100	130	127	119	99	133	126	118	114

chi2_value = 7.055285
p_value = 0.530680, SUCCESS

9. OVERLAPPING TEMPLATE OF ALL ONES TEST

Computational information:
(a) n (sequence_length) = 1000000
(b) m (block length of 1s) = 10
(c) M (length of substring) = 1032
(d) N (number of substrings) = 968
(e) lambda $[(M-m+1)/2^m]$ = 0.999023
(f) eta = 0.499512

Frequency:

0	1	2	3	4	>=5	Chi^2
590	140	94	61	41	42	3.6326

p_value = 0.603429, SUCCESS

10. UNIVERSAL TEST

Computational information:
(a) L = 7
(b) Q = 1280
(c) K = 141577
(d) sum = 877528.154264
(e) sigma = 0.002768
(f) variance = 3.125000
(g) exp_value = 6.196251
(h) phi = 6.198240
(i) WARNING: 1 bits were discarded.

p_value = 0.472519, SUCCESS

11. APPROXIMATE ENTROPY TEST

Computational information:
(a) m (block length) = 5
(b) n (sequence length) = 1000000

(c) Chi² = 17.716279
(d) Phi(m) = -3.465730
(e) Phi(m+1) = -4.158868
(f) ApEn = 0.693138
(g) Log(2) = 0.693147

p_value = 0.980593, SUCCESS

12. RANDOM EXCURSIONS TEST

Computational information:

(a) Number Of Cycles (J) = 1546
(b) Sequence Length (n) = 1000000
(c) Rejection Constraint = 500.000000

x = -4 chi² = 3.118949 p_value = 0.681653, SUCCESS
x = -3 chi² = 5.573951 p_value = 0.349905, SUCCESS
x = -2 chi² = 5.658985 p_value = 0.340827, SUCCESS
x = -1 chi² = 5.662354 p_value = 0.340471, SUCCESS
x = 1 chi² = 14.918499 p_value = 0.010716, SUCCESS
x = 2 chi² = 6.094134 p_value = 0.297167, SUCCESS
x = 3 chi² = 2.888584 p_value = 0.717158, SUCCESS
x = 4 chi² = 2.333505 p_value = 0.801334, SUCCESS

13. RANDOM EXCURSIONS VARIANT TEST

Computational information:

(a) Number Of Cycles (J) = 1546
(b) Sequence Length (n) = 1000000

(x = -9) Total visits = 1665; p-value = 0.603731
SUCCESS
(x = -8) Total visits = 1728; p-value = 0.398057
SUCCESS
(x = -7) Total visits = 1748; p-value = 0.313678
SUCCESS
(x = -6) Total visits = 1650; p-value = 0.572809
SUCCESS
(x = -5) Total visits = 1599; p-value = 0.750703
SUCCESS
(x = -4) Total visits = 1509; p-value = 0.801430
SUCCESS

(x = -3) Total visits = 1390; p-value = 0.209609
SUCCESS

(x = -2) Total visits = 1401; p-value = 0.132189
SUCCESS

(x = -1) Total visits = 1500; p-value = 0.408094
SUCCESS

(x = 1) Total visits = 1577; p-value = 0.577188
SUCCESS

(x = 2) Total visits = 1669; p-value = 0.201567
SUCCESS

(x = 3) Total visits = 1751; p-value = 0.099203
SUCCESS

(x = 4) Total visits = 1783; p-value = 0.107193
SUCCESS

(x = 5) Total visits = 1816; p-value = 0.105547
SUCCESS

(x = 6) Total visits = 1856; p-value = 0.092780
SUCCESS

(x = 7) Total visits = 1869; p-value = 0.107167
SUCCESS

(x = 8) Total visits = 1884; p-value = 0.116540
SUCCESS

(x = 9) Total visits = 1858; p-value = 0.173561
SUCCESS

14. SERIAL TEST

Computational information:

(a) Block length (m) = 5
(b) Sequence length (n) = 1000000
(c) Psi_m = 12.599104
(d) Psi_m-1 = 3.104416
(e) Psi_m-2 = 0.574000
(f) Del_1 = 9.494688
(g) Del_2 = 6.964272

p_value1 = 0.891653, SUCCESS

p_value2 = 0.540492, SUCCESS

15. LEMPEL-ZIV COMPRESSION TEST

Computational information:

(a) W (# of words) = 69588

p_value = 0.490589, SUCCESS