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THE NIST STATISTICAL TEST SUITE

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1. FREQUENCY TEST

Computational information:

- (a) The nth partial sum = -68
- (b) S_n/n = -0.000068

p_value = 0.945786, SUCCESS

2. BLOCK FREQUENCY TEST

Computational information:

- (a) χ^2 = 125656.000000
- (b) # of substrings = 125000
- (c) block length = 8

p_value = 0.094921, SUCCESS

3. CUMULATIVE SUMS TEST

Cumulative sums forward test:

Computational information:

- (a) The maximum partial sum =

p_value = 0.685772, SUCCESS

Cumulative sums reverse test:

Computational information:

- (a) The maximum partial sum =

p_value = 0.749585, SUCCESS

4. RUNS TEST

Computational information:

- (a) P_i = 0.499966
- (b) V_{n_obs} (Total # of runs) = 499612

$$\frac{(c) \sqrt{V_{n_obs} - 2 n p_i (1-p_i)}}{2 \sqrt{2n} p_i (1-p_i)} = 0.548712$$

p_value = 0.437752, SUCCESS

5. LONGEST RUNS OF ONES TEST

Computational information:

(a) N (# of substrings) = 100
 (b) M (Substring Length) = 10000
 (c) Chi^2 = 7.812354

Frequency

<=10	11	12	13	14	15	>=16
16	18	20	20	13	5	8

p_value = 0.252176, 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 = 282
 (e) F_31 = 568
 (f) F_30 = 126
 (g) # of matrices = 976
 (h) Chi^2 = 0.183014
 (i) NOTE: 576 BITS WERE DISCARDED.

p_value = 0.912555, SUCCESS

7. DFT TEST

Computational information:

(a) Percentile = 95.030800
 (b) N_l = 475154.000000
 (c) N_o = 475000.000000
 (d) d = 0.999284

p_value = 0.317657, 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	119	133	136	144	112	125	120	118

chi2_value = 7.806128
p_value = 0.452634, 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
607	153	83	51	28	46	4.0280

p_value = 0.545385, SUCCESS

10. UNIVERSAL TEST

Computational information:
(a) L = 7
(b) Q = 1280
(c) K = 141577
(d) sum = 876765.012804
(e) sigma = 0.002768
(f) variance = 3.125000
(g) exp_value = 6.196251
(h) phi = 6.192849
(i) WARNING: 1 bits were discarded.

p_value = 0.219196, SUCCESS

11. APPROXIMATE ENTROPY TEST

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

(c) Chi² = 23.716715
(d) Phi(m) = -3.465726
(e) Phi(m+1) = -4.158861
(f) ApEn = 0.693135
(g) Log(2) = 0.693147

p_value = 0.854486, SUCCESS

12. RANDOM EXCURSIONS TEST

Computational information:

(a) Number Of Cycles (J) = 1333
(b) Sequence Length (n) = 1000000
(c) Rejection Constraint = 500.000000

x = -4 chi² = 1.665375 p_value = 0.893233, SUCCESS
x = -3 chi² = 0.805448 p_value = 0.976685, SUCCESS
x = -2 chi² = 0.932298 p_value = 0.967840, SUCCESS
x = -1 chi² = 5.627157 p_value = 0.344204, SUCCESS
x = 1 chi² = 3.073518 p_value = 0.688652, SUCCESS
x = 2 chi² = 5.616988 p_value = 0.345288, SUCCESS
x = 3 chi² = 4.258603 p_value = 0.512815, SUCCESS
x = 4 chi² = 6.872967 p_value = 0.230261, SUCCESS

13. RANDOM EXCURSIONS VARIANT TEST

Computational information:

(a) Number Of Cycles (J) = 1333
(b) Sequence Length (n) = 1000000

(x = -9) Total visits = 1185; p-value = 0.486933
SUCCESS
(x = -8) Total visits = 1194; p-value = 0.487001
SUCCESS
(x = -7) Total visits = 1309; p-value = 0.897423
SUCCESS
(x = -6) Total visits = 1408; p-value = 0.661415
SUCCESS
(x = -5) Total visits = 1398; p-value = 0.674759
SUCCESS
(x = -4) Total visits = 1395; p-value = 0.649937
SUCCESS

(x = -3) Total visits = 1406; p-value = 0.527206
SUCCESS

(x = -2) Total visits = 1370; p-value = 0.679076
SUCCESS

(x = -1) Total visits = 1382; p-value = 0.342621
SUCCESS

(x = 1) Total visits = 1260; p-value = 0.157416
SUCCESS

(x = 2) Total visits = 1182; p-value = 0.091326
SUCCESS

(x = 3) Total visits = 1121; p-value = 0.066328
SUCCESS

(x = 4) Total visits = 1148; p-value = 0.175663
SUCCESS

(x = 5) Total visits = 1151; p-value = 0.240014
SUCCESS

(x = 6) Total visits = 1161; p-value = 0.315191
SUCCESS

(x = 7) Total visits = 1151; p-value = 0.328263
SUCCESS

(x = 8) Total visits = 1073; p-value = 0.193545
SUCCESS

(x = 9) Total visits = 1018; p-value = 0.138969
SUCCESS

14. SERIAL TEST

Computational information:

(a) Block length (m) = 5
(b) Sequence length (n) = 1000000
(c) Psi_m = 19.773184
(d) Psi_m-1 = 9.674944
(e) Psi_m-2 = 3.179648
(f) Del_1 = 10.098240
(g) Del_2 = 3.602944

p_value1 = 0.861448, SUCCESS

p_value2 = 0.891055, SUCCESS

15. LEMPEL-ZIV COMPRESSION TEST

Computational information:

(a) W (# of words) = 69589

p_value = 0.537151, SUCCESS