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THE NIST STATISTICAL TEST SUITE

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1. FREQUENCY TEST

Computational information:

- (a) The nth partial sum = 762
- (b) S_n/n = 0.000762

p_value = 0.446060, SUCCESS

2. BLOCK FREQUENCY TEST

Computational information:

- (a) χ^2 = 124508.500000
- (b) # of substrings = 125000
- (c) block length = 8

p_value = 0.837186, SUCCESS

3. CUMULATIVE SUMS TEST

Cumulative sums forward test:

Computational information:

- (a) The maximum partial sum =

p_value = 0.655013, SUCCESS

Cumulative sums reverse test:

Computational information:

- (a) The maximum partial sum =

p_value = 0.394576, SUCCESS

4. RUNS TEST

Computational information:

- (a) P_i = 0.500381
- (b) V_{n_obs} (Total # of runs) = 499870

$$\frac{(c) \sqrt{V_{n_obs} - 2 n p_i (1-p_i)}}{2 \sqrt{2n} p_i (1-p_i)} = 0.183437$$

p_value = 0.795312, SUCCESS

5. LONGEST RUNS OF ONES TEST

Computational information:

(a) N (# of substrings) = 100
(b) M (Substring Length) = 10000
(c) Chi^2 = 4.207545

Frequency

<=10	11	12	13	14	15	>=16
14	18	23	20	10	8	7

p_value = 0.648613, 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 = 278
(e) F_31 = 575
(f) F_30 = 123
(g) # of matrices = 976
(h) Chi^2 = 0.701807
(i) NOTE: 576 BITS WERE DISCARDED.

p_value = 0.704052, SUCCESS

7. DFT TEST

Computational information:

(a) Percentile = 95.041000
(b) N_l = 475205.000000
(c) N_o = 475000.000000
(d) d = 1.330216

p_value = 0.183447, 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	126	137	113	122	118	131	134	127

chi2_value = 4.875349
p_value = 0.770812, 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
594	142	83	60	43	46	3.9076

p_value = 0.562801, SUCCESS

10. UNIVERSAL TEST

Computational information:
(a) L = 7
(b) Q = 1280
(c) K = 141577
(d) sum = 877699.416247
(e) sigma = 0.002768
(f) variance = 3.125000
(g) exp_value = 6.196251
(h) phi = 6.199449
(i) WARNING: 1 bits were discarded.

p_value = 0.247951, SUCCESS

11. APPROXIMATE ENTROPY TEST

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

(c) Chi² = 30.995498
(d) Phi(m) = -3.465723
(e) Phi(m+1) = -4.158854
(f) ApEn = 0.693132
(g) Log(2) = 0.693147

p_value = 0.517240, SUCCESS

12. RANDOM EXCURSIONS TEST

Computational information:

(a) Number Of Cycles (J) = 0695
(b) Sequence Length (n) = 1000000
(c) Rejection Constraint = 500.000000

x = -4 chi² = 6.368847 p_value = 0.271964, SUCCESS
x = -3 chi² = 6.532901 p_value = 0.257760, SUCCESS
x = -2 chi² = 5.117311 p_value = 0.401732, SUCCESS
x = -1 chi² = 4.464748 p_value = 0.484614, SUCCESS
x = 1 chi² = 6.047482 p_value = 0.301626, SUCCESS
x = 2 chi² = 3.078550 p_value = 0.687877, SUCCESS
x = 3 chi² = 3.453953 p_value = 0.630366, SUCCESS
x = 4 chi² = 3.018492 p_value = 0.697135, SUCCESS

13. RANDOM EXCURSIONS VARIANT TEST

Computational information:

(a) Number Of Cycles (J) = 695
(b) Sequence Length (n) = 1000000

(x = -9) Total visits = 951; p-value = 0.095841
SUCCESS
(x = -8) Total visits = 915; p-value = 0.127610
SUCCESS
(x = -7) Total visits = 886; p-value = 0.155355
SUCCESS
(x = -6) Total visits = 895; p-value = 0.105785
SUCCESS
(x = -5) Total visits = 894; p-value = 0.075207
SUCCESS
(x = -4) Total visits = 900; p-value = 0.037686
SUCCESS

(x = -3) Total visits = 862; p-value = 0.045156
SUCCESS

(x = -2) Total visits = 798; p-value = 0.110705
SUCCESS

(x = -1) Total visits = 752; p-value = 0.126299
SUCCESS

(x = 1) Total visits = 644; p-value = 0.171335
SUCCESS

(x = 2) Total visits = 635; p-value = 0.352814
SUCCESS

(x = 3) Total visits = 645; p-value = 0.548666
SUCCESS

(x = 4) Total visits = 674; p-value = 0.831410
SUCCESS

(x = 5) Total visits = 702; p-value = 0.950097
SUCCESS

(x = 6) Total visits = 691; p-value = 0.974194
SUCCESS

(x = 7) Total visits = 697; p-value = 0.988129
SUCCESS

(x = 8) Total visits = 735; p-value = 0.781767
SUCCESS

(x = 9) Total visits = 764; p-value = 0.653528
SUCCESS

14. SERIAL TEST

Computational information:

(a) Block length (m) = 5
(b) Sequence length (n) = 1000000
(c) Psi_m = 26.562304
(d) Psi_m-1 = 9.599712
(e) Psi_m-2 = 4.369120
(f) Del_1 = 16.962592
(g) Del_2 = 11.732000

p_value1 = 0.388022, SUCCESS

p_value2 = 0.163568, SUCCESS

15. LEMPEL-ZIV COMPRESSION TEST

Computational information:

(a) W (# of words) = 69584

p_value = 0.311714, SUCCESS