

THE NIST STATISTICAL TEST SUITE
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1. FREQUENCY TEST

Computational information:
(a) The nth partial sum = 272
(b) S_n/n = 0.000272

p_value = 0.785622, SUCCESS

2. BLOCK FREQUENCY TEST

Computational information:
(a) χ^2 = 125434.000000
(b) # of substrings = 125000
(c) block length = 8

p_value = 0.192607, SUCCESS

3. CUMULATIVE SUMS TEST

Cumulative sums forward test:

Computational information:
(a) The maximum partial sum =

p_value = 0.582401, SUCCESS

Cumulative sums reverse test:

Computational information:
(a) The maximum partial sum =

p_value = 0.370864, SUCCESS

4. RUNS TEST

Computational information:
(a) π = 0.500136
(b) V_n _obs (Total # of runs) = 500241
(c) V_n _obs - 2 n π (1- π)
----- = 0.340878
2 sqrt(2n) π (1- π)

p_value = 0.629753, SUCCESS

5. LONGEST RUNS OF ONES TEST

Computational information:

(a) N (# of substrings) = 100
(b) M (Substring Length) = 10000
(c) Chi^2 = 7.981480

Frequency

<=10	11	12	13	14	15	>=16
8	18	31	15	18	3	7

p_value = 0.239463, 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 = 304
(e) F_31 = 537
(f) F_30 = 135
(g) # of matrices = 976
(h) Chi^2 = 3.165773
(i) NOTE: 576 BITS WERE DISCARDED.

p_value = 0.205381, SUCCESS

7. DFT TEST

Computational information:

(a) Percentile = 95.052600
(b) N_l = 475263.000000
(c) N_o = 475000.000000
(d) d = 1.706569

p_value = 0.087902, 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	134	127	126	144	114	121	118	112

chi2_value = 7.074554
p_value = 0.528611, 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) η = 0.499512

Frequency:

```
-----  
0   1   2   3   4   >=5   Chi^2  
-----  
565 156 100  65  30  52    4.0601  
-----
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p_value = 0.540792, SUCCESS

10. UNIVERSAL TEST

Computational information:

(a) L = 7
(b) Q = 1280
(c) K = 141577
(d) sum = 877239.532179
(e) sigma = 0.002768
(f) variance = 3.125000
(g) exp_value = 6.196251
(h) phi = 6.196201
(i) WARNING: 1 bits were discarded.

p_value = 0.985643, SUCCESS

11. APPROXIMATE ENTROPY TEST

Computational information:

(a) m (block length) = 5
(b) n (sequence length) = 1000000
(c) Chi^2 = 13.085288
(d) Phi(m) = -3.465730
(e) Phi(m+1) = -4.158871
(f) ApEn = 0.693141
(g) Log(2) = 0.693147

p_value = 0.998761, SUCCESS

12. RANDOM EXCURSIONS TEST

Computational information:

(a) Number Of Cycles (J) = 1244
(b) Sequence Length (n) = 1000000
(c) Rejection Constraint = 500.000000

x = -4 chi^2 = 3.263962 p_value = 0.659364, SUCCESS

x = -3 chi^2 = 1.798374 p_value = 0.876281, SUCCESS

x = -2 chi^2 = 0.880791 p_value = 0.971597, SUCCESS

x = -1 chi^2 = 1.549839 p_value = 0.907248, SUCCESS

x = 1 chi^2 = 4.744373 p_value = 0.447867, SUCCESS

x = 2 chi^2 = 5.291096 p_value = 0.381397, SUCCESS

x = 3 chi^2 = 5.136612 p_value = 0.399437, SUCCESS

x = 4 chi^2 = 2.506300 p_value = 0.775546, SUCCESS

13. RANDOM EXCURSIONS VARIANT TEST

Computational information:

(a) Number Of Cycles (J) = 1244

(b) Sequence Length (n) = 1000000

(x = -9) Total visits = 1324; p-value = 0.697282
SUCCESS

(x = -8) Total visits = 1326; p-value = 0.671226
SUCCESS

(x = -7) Total visits = 1330; p-value = 0.632514
SUCCESS

(x = -6) Total visits = 1320; p-value = 0.645946
SUCCESS

(x = -5) Total visits = 1277; p-value = 0.825458
SUCCESS

(x = -4) Total visits = 1244; p-value = 1.000000
SUCCESS

(x = -3) Total visits = 1219; p-value = 0.822644
SUCCESS

(x = -2) Total visits = 1207; p-value = 0.668456
SUCCESS

(x = -1) Total visits = 1250; p-value = 0.904254
SUCCESS

(x = 1) Total visits = 1176; p-value = 0.172796
SUCCESS

(x = 2) Total visits = 1093; p-value = 0.080499
SUCCESS

(x = 3) Total visits = 1019; p-value = 0.043663
SUCCESS

(x = 4) Total visits = 985; p-value = 0.049696
SUCCESS

(x = 5) Total visits = 1001; p-value = 0.104397
SUCCESS

(x = 6) Total visits = 1037; p-value = 0.210838
SUCCESS

(x = 7) Total visits = 1126; p-value = 0.511745
SUCCESS

(x = 8) Total visits = 1196; p-value = 0.803772
SUCCESS

(x = 9) Total visits = 1186; p-value = 0.777929
SUCCESS

14. SERIAL TEST

Computational information:

(a) Block length (m) = 5

(b) Sequence length (n) = 1000000

(c) Ψ_m = 12.070720

(d) Ψ_{m-1} = 5.783040

(e) Ψ_{m-2} = 1.562944

(f) Del_1 = 6.287680

(g) Del_2 = 2.067584

p_value1 = 0.984679, SUCCESS

p_value2 = 0.978870, SUCCESS

15. LEMPEL-ZIV COMPRESSION TEST

Computational information:

(a) W (# of words) = 69581

p_value = 0.200019, SUCCESS