

# ON THE CONJECTURE $D_s^{(k)}(1) = 1$ or $0$ for $k \geq 2$

by Jim Duncan

Problem(v11)

For the first 32 000  $S(n)$ 's the conjecture that  $D_s^{(k)}(1) = 1$  or  $0$  for  $k \geq 2$  is true. The ratio of the number of ones to the number of zeros appears to be approximately 1 for large values of  $k$ . The results are shown in Results Table 3.

The true differences  $S(x-1) - S(x)$  were calculated and the  $k^{\text{th}}$  order differences  $D_s^{(k)}(1)$  were found to increase rapidly with increasing  $k$ . For large values of  $k$  ( $> 100$ ) the ratio  $D_s^{(k)}(1)/D_s^{(k-1)}(1)$  is approximately equal to  $-2$ . Some values are shown in Results Table 4.

RESULTS TABLE 3

k	$D_s^{(k)}(1)$	Ratio: <u>total 1's</u> total 0's
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$D_1 = 2$	
D1000 = 0	st1/st0 = 1.112051
D2000 = 0	st1/st0 = 1.056584
D3000 = 0	st1/st0 = 1.075433
D4000 = 0	st1/st0 = 1.015625
D5000 = 0	st1/st0 = 1.010861
D6000 = 1	st1/st0 = 0.991039
D7000 = 0	st1/st0 = 0.990048
D8000 = 0	st1/st0 = 0.977014
D9000 = 0	st1/st0 = 0.987412
D10000 = 0	st1/st0 = 0.998201
D11000 = 1	st1/st0 = 1.011154
D12000 = 1	st1/st0 = 1.010556
D13000 = 1	st1/st0 = 1.015036
D14000 = 0	st1/st0 = 1.018601
D15000 = 1	st1/st0 = 1.012748
D16000 = 0	st1/st0 = 1.004134
D17000 = 0	st1/st0 = 1.005308
D18000 = 0	st1/st0 = 1.004789
D19000 = 1	st1/st0 = 1.003903
D20000 = 1	st1/st0 = 1.004711
D21000 = 0	st1/st0 = 1.008129
D22000 = 0	st1/st0 = 1.004830
D23000 = 0	st1/st0 = 1.004620
D24000 = 0	st1/st0 = 1.003590
D25000 = 1	st1/st0 = 1.004571
D26000 = 1	st1/st0 = 1.001001
D27000 = 0	st1/st0 = 1.001260
D28000 = 1	st1/st0 = 1.004080
D29000 = 0	st1/st0 = 1.006018
D30000 = 1	st1/st0 = 1.005415
D31000 = 0	st1/st0 = 1.006408
D32000 = 1	st1/st0 = 1.004699

## RESULTS

TABLE 4

k	$D_s^{*(k)}(1)$	$D_s^{*(k)}(1)$
		$D_s^{*(k-1)}(1)$
D951	= 2.244421E+288	ratio = -2.002974
D952	= -4.496445E+288	ratio = -2.003387
D953	= 9.009916E+288	ratio = -2.003787
D954	= -1.805740E+289	ratio = -2.004170
D955	= 3.619671E+289	ratio = -2.004535
D956	= -7.257009E+289	ratio = -2.004881
D957	= 1.455178E+290	ratio = -2.005204
D958	= -2.918366E+290	ratio = -2.005504
D959	= 5.853595E+290	ratio = -2.005778
D960	= -1.174247E+291	ratio = -2.006026
D961	= 2.355827E+291	ratio = -2.006246
D962	= -4.726819E+291	ratio = -2.006437
D963	= 9.484823E+291	ratio = -2.006598
D964	= -1.903346E+292	ratio = -2.006728
D965	= 3.819685E+292	ratio = -2.006827
D966	= -7.665702E+292	ratio = -2.006894
D967	= 1.538452E+293	ratio = -2.006929
D968	= -3.087569E+293	ratio = -2.006932
D969	= 6.196454E+293	ratio = -2.006904
D970	= -1.243531E+294	ratio = -2.006843
D971	= 2.495458E+294	ratio = -2.006751
D972	= -5.007457E+294	ratio = -2.006629
D973	= 1.004734E+295	ratio = -2.006476
D974	= -2.015791E+295	ratio = -2.006293
D975	= 4.043841E+295	ratio = -2.006081
D976	= -8.111306E+295	ratio = -2.005842
D977	= 1.626784E+296	ratio = -2.005576
D978	= -3.262162E+296	ratio = -2.005283
D979	= 6.540525E+296	ratio = -2.004966
D980	= -1.311130E+297	ratio = -2.004625
D981	= 2.627848E+297	ratio = -2.004262
D982	= -5.265885E+297	ratio = -2.003877
D983	= 1.055006E+298	ratio = -2.003473
D984	= -2.113228E+298	ratio = -2.003049
D985	= 4.231969E+298	ratio = -2.002608
D986	= -8.473041E+298	ratio = -2.002151
D987	= 1.696031E+299	ratio = -2.001679
D988	= -3.394086E+299	ratio = -2.001193
D989	= 6.790531E+299	ratio = -2.000695
D990	= -1.358233E+300	ratio = -2.000186
D991	= 2.716013E+300	ratio = -1.999667
D992	= -5.429688E+300	ratio = -1.999139
D993	= 1.085180E+301	ratio = -1.998604
D994	= -2.168257E+301	ratio = -1.998063
D995	= 4.331129E+301	ratio = -1.997516
D996	= -8.649119E+301	ratio = -1.996966
D997	= 1.726721E+302	ratio = -1.996413
D998	= -3.446291E+302	ratio = -1.995858
D999	= 6.876396E+302	ratio = -1.995303
D1000	= -1.371668E+303	ratio = -1.994748