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IN REPLY
REFER TO: C-DO

June 2, 1971

Dr. Neil J. A. Sloane
Room 26-363
Bell Telephone Laboratories
Murray Hill, NJ 07974

Dear Neil,

Here is a verified list, through n = 20, of the number of nonisomorphic functions on an n-set ("number of functional diagraphs"). By "verified" I mean that these numbers were calculated in two independent ways: by Davis' formula and by Read's own method (your reference). The numbers agree exactly. Evidently, Read made a mistake at n = 12--not surprising, since he seems to have done the work by hand.

n	F_n
1	1
2	3
3	7
4	19
5	47
6	130
7	343
8	951
9	2615
10	7318
11	20491
12	57903
13	163898
14	466199
15	1328993
16	3799624
17	10884049
18	31241170
19	89814958
20	258604642

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I also enclose the preprint I told you about (LA-DC 12449). See the remarks on p. 20, and compare Table II (p. 8) with Gilbert and Riordan's Table II (your reference p. 663) for the column labeled $C_n \times S_2$. This is A_{48}

The enumeration problem arising from our construction can be given the following simple integer formulation. Consider the iterative scheme:

$$x_{n+1} = 2x_n, \quad 0 < x_n \leq 2^{k-1}$$

$$1 \leq n \leq k.$$

$$x_{n+1} = 2(2^k - x_n), \quad 2^{k-1} < x_n < 2^k$$

Now consider the odd integers $2^{k-1} + 1$, $2^{k-1} + 3$, $\cdots$, $2^k - 1$. Each of these iterates under the above scheme to $x_k = 2^{k-1}$ in k-1 steps. The 2^{k-2} sequences so generated are of two types: either the initial value is the largest integer in the sequence, or it isn't. The number of sequences of the first type is (experimentally) equal to what Gilbert and Riordan count--why? A_{48}

I look forward to receiving the latest version of your dictionary. When I have examined it, I'll see whether I have anything of interest to add.

Best regards,

Paul

Paul R. Stein

PRS/dc

Enclosure: as cited