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B. A. Huberman,
T. H. Hogg
and
NIAS,
Correspondence
1985

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XEROX

March 25, 1985

Dr. N. J. A. Sloane
ATT Bell Laboratories
Room 2C-376
Murray Hill, N. J. 07974

Dear Dr. Sloane:

It was nice to read your enthusiastic note about our paper, and to learn of your desire to publish our numbers in the second edition of your Handbook of Integer Sequences.

Recently, Paul Stein of Los Alamos mentioned to us that the H numbers are already contained in your book (as iterated exponentials). Moreover, the Λ's as given by Eq (21) of our paper, and which measure the average distance two inputs must travel down a parallel computing structure before they map to the same output, are not integers. We therefore enclose a table of the *total* distance two inputs must travel, and which is given by integers. These are more appropriate for inclusion in your Handbook and, like the Λ's, also characterize the self-repairing properties of computation with attractors. They are given by $n \cdot H^n_m \cdot \Lambda^n_m$, where H^n_m and Λ^n_m are given by Eqs. (16) and (21), respectively. Here is a listing, which you can choose to list in any order you wish,

(m is row number, n is column number)

n * H * Lambda

0	1	2	3	4	5	6	
0	3	16	75	356	1770	9306	new 5947
0	6	52	411	3392	30070	287802	new 5948
0	10	120	1335	15708	200610	2790510	new 5949
0	15	230	3300	50428	841125	15353220	
0	21	392	6888	129472	2665670	60236076	
0	28	616	12810	285824	7002100	183641836	

If you have any questions please do not hesitate to contact us.

Sincerely,

B. A. Huberman

Hubermann

XEROX CORPORATION, PALO ALTO RESEARCH CENTER, 3333 COYOTE HILL RD., PALO ALTO, CA. 94304 . (415) 494-4147

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XEROX

January 28, 1985

Dr. N. J. A. Sloane
ATT Bell Laboratories
Murray Hill, NJ 07974

attractors on finite sets

Dear Dr. Sloane:

The enclosed manuscript, which has been submitted to Physical Review, contains two new sets of numbers which arise in the study of contractive integer mappings. Since we were not able to find them in your book, and due to their wide applicability to the dynamics of computing structures, you might want consider them for inclusion in your book.

Specifically, the numbers are 1) $H^n{}_m$ which is the total number of maps that take a set of n inputs into one output in m steps; and 2) $\Lambda^n{}_m$ the tumbling index, which measures the average distance two inputs must travel before they map to the same output. The recursion relation for $H^n{}_m$ is given by Eq. (16) on page 14, and their generating function is given in the appendix. $\Lambda^n{}_m$ is given by Eq. (21) on page 16. It might also interest you to know that for $m=2$, the H numbers reduce to the Bell numbers.

We will appreciate any comments you may have.

Sincerely,

B A Huberman

B. A. Huberman

Tad Hogg

T. H. Hogg

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N.J.A. Sloane
Room 2C-376

November 26, 1985

Dr. B. A. Huberman
General Sciences Laboratory
Xerox Palo Alto Research Center
3333 Coyote Hill Road
Palo Alto, CA 93404

Dear Dr. Huberman:

Thank you very much indeed for those lovely new sequences. I will put them into the second edition.

Many thanks.

Best regards,

NJAS/lp

N.J.A. Sloane

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May 29, 1991

Dr. N. J. A. Sloane
ATT Bell Labs, 2C-376
Murray Hill, N. J. 07974

Dear Dr. Sloane:

I was happy to learn that you will be updating your book and that our sequences will be quoted there. Enclosed you will find the two papers that contain the relevant material.

Thank you for your interest. When will your book be published?

Sincerely,

B. A. Huberman
Research Fellow