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CASE WESTERN RESERVE UNIVERSITY

August 15, 1994

Dr. N. J. A. Sloane
ATT Bell Labs, Room 2C-376
600 Mountain Ave.
Murray Hill, NJ 07974

Dear Dr. Sloane:

When I read about your new on-line sequence analyzer in the July 22 issue of Science I was naturally eager to try it. It did not find exact matches for two sequences I tested, and so I am sending them here to you for possible inclusion in future versions of your list (copies of search and reprint enclosed).

My sequences are:

Number of 4-colorings of cyclic groups Z_1, Z_2, ...: 3, 10, 21, 44, 83, ...

Number of 5-colorings of cyclic groups Z_1, Z_2, ...: 4, 16, 52, 144, 420, ...

where an n-coloring of a group G is a function $f: G \to Z_n$ satisfying $f(x+y) \neq f(x) + f(y)$. As explained in my paper (R. Haas, "Three-colorings of finite groups, or An algebra of nonequalities," Mathematics Magazine 63 (1990) 211-225), the name "coloring" is given by analogy because f avoids the sum f(x) + f(y) in the same way that a graph coloring avoids coloring adjacent vertices of a graph the same. The number of 1-colorings of Z_1, Z_2,... is trivially 0, 0, 0, 0, 0, ..., and the 2-colorings are 1, 2, 1, 2, 1, ...; by my paper's main result the number of 3-colorings is 2, 4, 6, 8, 10, ... I had calculated the number of 4- and 5-colorings by hand to look for a pattern but found none; I will enjoy following up the partial match and generating function your analyzer did report.

Thank you for making your sequence analyzer so easily available to the general mathematical community.

Sincerely yours,

Robert Haas

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