

Weekly Meeting

Topic: Algorithm for $3 \times 3 \times 3$ and 9×9

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Result for finding $3 \times 3 \times 3$

idx	num_of_columns	columns	wlp	is_comp
1	390	11 1 2 5 14 22 9 24 31 34 39 3	3 42 111 132	FALSE
2	391	11 1 2 5 14 22 9 24 31 3 25 13	3 48 84 177	FALSE
3	392	11 1 2 5 14 22 9 24 25 7 12 18	3 54 63 195	FALSE
4	792	12 1 2 5 14 22 9 24 31 3 25 13 37	4 72 144 354	FALSE
21	793	12 1 2 5 14 22 9 24 25 7 12 18 38	4 81 108 390	FALSE
11	1599	13 1 2 5 14 22 9 24 31 3 25 13 37 6	7 102 219 690	FALSE
22	1600	13 1 2 5 14 22 9 24 25 7 12 18 38 3	7 105 207 696	FALSE
12	3104	14 1 2 5 14 22 9 24 31 3 25 13 37 6 18	10 140 334 1236	FALSE
23	3105	14 1 2 5 14 22 9 24 25 7 12 18 38 3 31	10 141 330 1236	FALSE
31	3106	14 1 2 5 14 22 9 24 31 3 25 13 37 6 7	10 144 330 1209	FALSE
13	5763	15 1 2 5 14 22 9 24 31 3 25 13 37 6 18 7	13 192 495 2055	FALSE
14	10067	16 1 2 5 14 22 9 24 31 3 25 13 37 6 18 7 35	16 256 720 3288	FALSE
15	16541	17 1 2 5 14 22 9 24 31 3 25 13 37 6 18 7 35 15	24 304 1096 4984	FALSE
16	25387	18 1 2 5 14 22 9 24 31 3 25 13 37 15 23 16 34 6 38	30 369 1602 7443	FALSE
17	36526	19 1 2 5 14 22 9 24 31 3 25 13 37 15 23 16 34 6 38 27	39 435 2313 10521	FALSE
18	49289	20 1 2 5 14 22 9 24 31 3 25 13 37 15 23 16 34 6 38 27 8	51 519 3108 15051	FALSE
19	48963	21 7 11 12 13 17 18 19 20 21 23 26 27 28 30 32 34 35...	58 383 2220 10864	TRUE
110	35798	22 7 11 12 13 17 18 19 20 21 23 26 27 28 29 30 32 34...	48 300 1647 7449	TRUE
111	24493	23 7 11 12 13 15 16 17 18 23 25 26 27 28 29 30 32 33...	40 230 1196 4992	TRUE
112	15060	24 3 6 7 8 10 12 13 16 17 18 19 20 23 27 28 30 32 33 ...	32 174 855 3242	TRUE
24	15053	24 3 4 6 8 12 13 16 17 18 19 20 23 26 27 28 29 30 31 ...	32 168 864 3296	TRUE
113	8874	25 3 4 6 7 11 12 13 16 17 19 20 21 23 25 26 28 30 32 ...	26 126 594 2060	TRUE

Property for finding 9×9

If $D = (d_1, \dots, d_m)$ is constructed via $D = A + B/2 + 3/2$, and D is SOA(2+), then for all $i \neq j$, the following statements are equivalent:

- (d_i, d_j) achieve stratification over $s^2 \times s^2$ grids.
- (a_i, a_j, b_i, b_j) is OA($n, 4, s, 4$).
- $a_i b_i, a_j b_j, b_i$ and b_j are different factors chosen from the saturated design S .

An idea for 9×9

1. Fix a_i , find all possible b_i that could form a line with a_i .
2. Make many design B without duplicated factors.
3. For each B , calculate how many pair (i, j) satisfies $(a_i b_i, a_j b_j, b_i, b_j)$ being different factors.
4. Select B with the most pairs satisfying the condition.

But...

corresponding_bi	list [40]	List of length 40
[[1]]	double [39]	2 3 4 5 6 10 ...
[[2]]	double [39]	1 3 4 5 7 11 ...
[[3]]	double [39]	1 2 4 5 8 12 ...
[[4]]	double [39]	1 2 3 5 9 13 ...
[[5]]	double [39]	1 6 10 2 7 11 ...
[[6]]	double [39]	1 5 10 2 8 9 ...
[[7]]	double [39]	1 8 13 2 5 11 ...
[[8]]	double [39]	1 7 13 2 6 9 ...
[[9]]	double [39]	1 12 11 2 6 8 ...
[[10]]	double [39]	1 5 6 2 12 13 ...
[[11]]	double [39]	1 9 12 2 5 7 ...
[[12]]	double [39]	1 9 11 2 10 13 ...
[[13]]	double [39]	1 7 8 2 10 12 ...
[[14]]	double [39]	1 15 28 2 16 29 ...
[[15]]	double [39]	1 14 28 2 17 18 ...
[[16]]	double [39]	1 17 31 2 14 29 ...
[[17]]	double [39]	1 16 31 2 15 18 ...
[[18]]	double [39]	1 30 29 2 15 17 ...
[[19]]	double [39]	1 20 37 2 21 38 ...
[[20]]	double [39]	1 19 37 2 22 23 ...
[[21]]	double [39]	1 22 40 2 19 38 ...
[[22]]	double [39]	1 21 40 2 20 23 ...
[[23]]	double [39]	1 39 38 2 20 22 ...