# Rank-65759 over GF(32)

January 15, 2021

## The equation

The equation of the surface is :

$$X_2^3 + X_3^3 + X_0^2X_1 + X_0^2X_3 + X_0X_1^2 + X_0X_1X_2 = 0$$

( 0, 0, 1, 1, 1, 0, 1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0 )
The point rank of the equation over GF(32) is -2111764443

## General information

| | |
|---|---|
| Number of lines | 3 |
| Number of points | 1089 |
| Number of singular points | 1 |
| Number of Eckardt points | 0 |
| Number of double points | 3 |
| Number of single points | 93 |
| Number of points off lines | 993 |
| Number of Hesse planes | 0 |
| Number of axes | 0 |
| Type of points on lines | $33^3$ |
| Type of lines on points | $2^3$, $1^{93}$, $0^{993}$ |

### Singular Points

The surface has 1 singular points:

$0: \ P_4 = \mathbf{P}(1,1,1,1) = \mathbf{P}(1,1,1,1)$

## The 3 Lines

The lines and their Pluecker coordinates are:

$$\ell_0 = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 1 & 1 \end{bmatrix}_{33} = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 1 & 1 \end{bmatrix}_{33} = \mathbf{Pl}(1,0,1,0,1,0)_{1153}$$

$$\ell_1 = \begin{bmatrix} 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 1 \end{bmatrix}_{1082369} = \begin{bmatrix} 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 1 \end{bmatrix}_{1082369} = \mathbf{Pl}(0,0,0,1,0,1)_{36865}$$

$$\ell_2 = \begin{bmatrix} 1 & 1 & 0 & 0 \\ 0 & 0 & 1 & 1 \end{bmatrix}_{2082} = \begin{bmatrix} 1 & 1 & 0 & 0 \\ 0 & 0 & 1 & 1 \end{bmatrix}_{2082} = \mathbf{Pl}(0,0,1,1,1,1)_{70562}$$

Rank of lines: ( 33, 1082369, 2082 )
Rank of points on Klein quadric: ( 1153, 36865, 70562 )

### Eckardt Points

The surface has 0 Eckardt points:

### Double Points

The surface has 3 Double points:
The double points on the surface are:

$P_{2114} = (0,1,1,1) = \ell_0 \cap \ell_1$
$P_{2082} = (0,0,1,1) = \ell_1 \cap \ell_2$
$P_4 = (1,1,1,1) = \ell_0 \cap \ell_2$

### Single Points

The surface has 93 single points:
The single points on the surface are:

0 : $P_0 = (1,0,0,0)$ lies on line $\ell_0$
1 : $P_1 = (0,1,0,0)$ lies on line $\ell_1$
2 : $P_5 = (1,1,0,0)$ lies on line $\ell_2$
3 : $P_{2115} = (2,1,1,1)$ lies on line $\ell_0$
4 : $P_{2116} = (3,1,1,1)$ lies on line $\ell_0$
5 : $P_{2117} = (4,1,1,1)$ lies on line $\ell_0$
6 : $P_{2118} = (5,1,1,1)$ lies on line $\ell_0$
7 : $P_{2119} = (6,1,1,1)$ lies on line $\ell_0$
8 : $P_{2120} = (7,1,1,1)$ lies on line $\ell_0$
9 : $P_{2121} = (8,1,1,1)$ lies on line $\ell_0$
10 : $P_{2122} = (9,1,1,1)$ lies on line $\ell_0$
11 : $P_{2123} = (10,1,1,1)$ lies on line $\ell_0$
12 : $P_{2124} = (11,1,1,1)$ lies on line $\ell_0$
13 : $P_{2125} = (12,1,1,1)$ lies on line $\ell_0$
14 : $P_{2126} = (13,1,1,1)$ lies on line $\ell_0$
15 : $P_{2127} = (14,1,1,1)$ lies on line $\ell_0$
16 : $P_{2128} = (15,1,1,1)$ lies on line $\ell_0$
17 : $P_{2129} = (16,1,1,1)$ lies on line $\ell_0$
18 : $P_{2130} = (17,1,1,1)$ lies on line $\ell_0$
19 : $P_{2131} = (18,1,1,1)$ lies on line $\ell_0$
20 : $P_{2132} = (19,1,1,1)$ lies on line $\ell_0$
21 : $P_{2133} = (20,1,1,1)$ lies on line $\ell_0$
22 : $P_{2134} = (21,1,1,1)$ lies on line $\ell_0$
23 : $P_{2135} = (22,1,1,1)$ lies on line $\ell_0$
24 : $P_{2136} = (23,1,1,1)$ lies on line $\ell_0$
25 : $P_{2137} = (24,1,1,1)$ lies on line $\ell_0$
26 : $P_{2138} = (25,1,1,1)$ lies on line $\ell_0$
27 : $P_{2139} = (26,1,1,1)$ lies on line $\ell_0$
28 : $P_{2140} = (27,1,1,1)$ lies on line $\ell_0$
29 : $P_{2141} = (28,1,1,1)$ lies on line $\ell_0$
30 : $P_{2142} = (29,1,1,1)$ lies on line $\ell_0$
31 : $P_{2143} = (30,1,1,1)$ lies on line $\ell_0$
32 : $P_{2144} = (31,1,1,1)$ lies on line $\ell_0$
33 : $P_{2145} = (0,2,1,1)$ lies on line $\ell_1$
34 : $P_{2147} = (2,2,1,1)$ lies on line $\ell_2$
35 : $P_{2177} = (0,3,1,1)$ lies on line $\ell_1$
36 : $P_{2180} = (3,3,1,1)$ lies on line $\ell_2$
37 : $P_{2209} = (0,4,1,1)$ lies on line $\ell_1$
38 : $P_{2213} = (4,4,1,1)$ lies on line $\ell_2$
39 : $P_{2241} = (0,5,1,1)$ lies on line $\ell_1$
40 : $P_{2246} = (5,5,1,1)$ lies on line $\ell_2$
41 : $P_{2273} = (0,6,1,1)$ lies on line $\ell_1$
42 : $P_{2279} = (6,6,1,1)$ lies on line $\ell_2$
43 : $P_{2305} = (0,7,1,1)$ lies on line $\ell_1$
44 : $P_{2312} = (7,7,1,1)$ lies on line $\ell_2$
45 : $P_{2337} = (0,8,1,1)$ lies on line $\ell_1$
46 : $P_{2345} = (8,8,1,1)$ lies on line $\ell_2$
47 : $P_{2369} = (0,9,1,1)$ lies on line $\ell_1$
48 : $P_{2378} = (9,9,1,1)$ lies on line $\ell_2$
49 : $P_{2401} = (0,10,1,1)$ lies on line $\ell_1$
50 : $P_{2411} = (10,10,1,1)$ lies on line $\ell_2$
51 : $P_{2433} = (0,11,1,1)$ lies on line $\ell_1$

52 : $P_{2444} = (11, 11, 1, 1)$ lies on line $\ell_2$
53 : $P_{2465} = (0, 12, 1, 1)$ lies on line $\ell_1$
54 : $P_{2477} = (12, 12, 1, 1)$ lies on line $\ell_2$
55 : $P_{2497} = (0, 13, 1, 1)$ lies on line $\ell_1$
56 : $P_{2510} = (13, 13, 1, 1)$ lies on line $\ell_2$
57 : $P_{2529} = (0, 14, 1, 1)$ lies on line $\ell_1$
58 : $P_{2543} = (14, 14, 1, 1)$ lies on line $\ell_2$
59 : $P_{2561} = (0, 15, 1, 1)$ lies on line $\ell_1$
60 : $P_{2576} = (15, 15, 1, 1)$ lies on line $\ell_2$
61 : $P_{2593} = (0, 16, 1, 1)$ lies on line $\ell_1$
62 : $P_{2609} = (16, 16, 1, 1)$ lies on line $\ell_2$
63 : $P_{2625} = (0, 17, 1, 1)$ lies on line $\ell_1$
64 : $P_{2642} = (17, 17, 1, 1)$ lies on line $\ell_2$
65 : $P_{2657} = (0, 18, 1, 1)$ lies on line $\ell_1$
66 : $P_{2675} = (18, 18, 1, 1)$ lies on line $\ell_2$
67 : $P_{2689} = (0, 19, 1, 1)$ lies on line $\ell_1$
68 : $P_{2708} = (19, 19, 1, 1)$ lies on line $\ell_2$
69 : $P_{2721} = (0, 20, 1, 1)$ lies on line $\ell_1$
70 : $P_{2741} = (20, 20, 1, 1)$ lies on line $\ell_2$
71 : $P_{2753} = (0, 21, 1, 1)$ lies on line $\ell_1$
72 : $P_{2774} = (21, 21, 1, 1)$ lies on line $\ell_2$
73 : $P_{2785} = (0, 22, 1, 1)$ lies on line $\ell_1$
74 : $P_{2807} = (22, 22, 1, 1)$ lies on line $\ell_2$
75 : $P_{2817} = (0, 23, 1, 1)$ lies on line $\ell_1$
76 : $P_{2840} = (23, 23, 1, 1)$ lies on line $\ell_2$
77 : $P_{2849} = (0, 24, 1, 1)$ lies on line $\ell_1$
78 : $P_{2873} = (24, 24, 1, 1)$ lies on line $\ell_2$
79 : $P_{2881} = (0, 25, 1, 1)$ lies on line $\ell_1$
80 : $P_{2906} = (25, 25, 1, 1)$ lies on line $\ell_2$
81 : $P_{2913} = (0, 26, 1, 1)$ lies on line $\ell_1$
82 : $P_{2939} = (26, 26, 1, 1)$ lies on line $\ell_2$
83 : $P_{2945} = (0, 27, 1, 1)$ lies on line $\ell_1$
84 : $P_{2972} = (27, 27, 1, 1)$ lies on line $\ell_2$
85 : $P_{2977} = (0, 28, 1, 1)$ lies on line $\ell_1$
86 : $P_{3005} = (28, 28, 1, 1)$ lies on line $\ell_2$
87 : $P_{3009} = (0, 29, 1, 1)$ lies on line $\ell_1$
88 : $P_{3038} = (29, 29, 1, 1)$ lies on line $\ell_2$
89 : $P_{3041} = (0, 30, 1, 1)$ lies on line $\ell_1$
90 : $P_{3071} = (30, 30, 1, 1)$ lies on line $\ell_2$
91 : $P_{3073} = (0, 31, 1, 1)$ lies on line $\ell_1$
92 : $P_{3104} = (31, 31, 1, 1)$ lies on line $\ell_2$

The single points on the surface are:

**Points on surface but on no line**

The surface has 993 points not on any line:
The points on the surface but not on lines are:

0 : $P_{68} = (1, 1, 1, 0)$
1 : $P_{107} = (8, 2, 1, 0)$
2 : $P_{110} = (11, 2, 1, 0)$
3 : $P_{173} = (10, 4, 1, 0)$
4 : $P_{178} = (15, 4, 1, 0)$
5 : $P_{293} = (2, 8, 1, 0)$
6 : $P_{302} = (11, 8, 1, 0)$
7 : $P_{342} = (19, 9, 1, 0)$
8 : $P_{350} = (27, 9, 1, 0)$
9 : $P_{359} = (4, 10, 1, 0)$
10 : $P_{370} = (15, 10, 1, 0)$
11 : $P_{389} = (2, 11, 1, 0)$
12 : $P_{395} = (8, 11, 1, 0)$
13 : $P_{469} = (18, 13, 1, 0)$
14 : $P_{481} = (30, 13, 1, 0)$
15 : $P_{499} = (16, 14, 1, 0)$
16 : $P_{514} = (31, 14, 1, 0)$
17 : $P_{519} = (4, 15, 1, 0)$
18 : $P_{525} = (10, 15, 1, 0)$
19 : $P_{561} = (14, 16, 1, 0)$
20 : $P_{578} = (31, 16, 1, 0)$
21 : $P_{624} = (13, 18, 1, 0)$
22 : $P_{641} = (30, 18, 1, 0)$
23 : $P_{652} = (9, 19, 1, 0)$
24 : $P_{670} = (27, 19, 1, 0)$
25 : $P_{908} = (9, 27, 1, 0)$
26 : $P_{918} = (19, 27, 1, 0)$
27 : $P_{1008} = (13, 30, 1, 0)$
28 : $P_{1013} = (18, 30, 1, 0)$
29 : $P_{1041} = (14, 31, 1, 0)$
30 : $P_{1043} = (16, 31, 1, 0)$
31 : $P_{1059} = (1, 0, 0, 1)$
32 : $P_{1091} = (1, 1, 0, 1)$
33 : $P_{1128} = (6, 2, 0, 1)$
34 : $P_{1147} = (25, 2, 0, 1)$
35 : $P_{1192} = (6, 4, 0, 1)$
36 : $P_{1206} = (20, 4, 0, 1)$
37 : $P_{1266} = (16, 6, 0, 1)$
38 : $P_{1277} = (27, 6, 0, 1)$
39 : $P_{1496} = (22, 13, 0, 1)$
40 : $P_{1503} = (29, 13, 0, 1)$
41 : $P_{1590} = (20, 16, 0, 1)$
42 : $P_{1599} = (29, 16, 0, 1)$
43 : $P_{1700} = (2, 20, 0, 1)$
44 : $P_{1711} = (13, 20, 0, 1)$
45 : $P_{1764} = (2, 22, 0, 1)$

46 : $P_{1778} = (16, 22, 0, 1)$
47 : $P_{1862} = (4, 25, 0, 1)$
48 : $P_{1871} = (13, 25, 0, 1)$
49 : $P_{1944} = (22, 27, 0, 1)$
50 : $P_{1947} = (25, 27, 0, 1)$
51 : $P_{1990} = (4, 29, 0, 1)$
52 : $P_{2013} = (27, 29, 0, 1)$
53 : $P_{3123} = (18, 0, 2, 1)$
54 : $P_{3144} = (7, 1, 2, 1)$
55 : $P_{3193} = (24, 2, 2, 1)$
56 : $P_{3205} = (4, 3, 2, 1)$
57 : $P_{3224} = (23, 3, 2, 1)$
58 : $P_{3240} = (7, 4, 2, 1)$
59 : $P_{3261} = (28, 4, 2, 1)$
60 : $P_{3269} = (4, 5, 2, 1)$
61 : $P_{3290} = (25, 5, 2, 1)$
62 : $P_{3299} = (2, 6, 2, 1)$
63 : $P_{3316} = (19, 6, 2, 1)$
64 : $P_{3340} = (11, 7, 2, 1)$
65 : $P_{3358} = (29, 7, 2, 1)$
66 : $P_{3428} = (3, 10, 2, 1)$
67 : $P_{3456} = (31, 10, 2, 1)$
68 : $P_{3460} = (3, 11, 2, 1)$
69 : $P_{3462} = (5, 11, 2, 1)$
70 : $P_{3494} = (5, 12, 2, 1)$
71 : $P_{3516} = (27, 12, 2, 1)$
72 : $P_{3564} = (11, 14, 2, 1)$
73 : $P_{3570} = (17, 14, 2, 1)$
74 : $P_{3629} = (12, 16, 2, 1)$
75 : $P_{3635} = (18, 16, 2, 1)$
76 : $P_{3787} = (10, 21, 2, 1)$
77 : $P_{3804} = (27, 21, 2, 1)$
78 : $P_{3822} = (13, 22, 2, 1)$
79 : $P_{3832} = (23, 22, 2, 1)$
80 : $P_{3860} = (19, 23, 2, 1)$
81 : $P_{3872} = (31, 23, 2, 1)$
82 : $P_{3897} = (24, 24, 2, 1)$
83 : $P_{3902} = (29, 24, 2, 1)$
84 : $P_{3906} = (1, 25, 2, 1)$
85 : $P_{3918} = (13, 25, 2, 1)$
86 : $P_{3938} = (1, 26, 2, 1)$
87 : $P_{3965} = (28, 26, 2, 1)$
88 : $P_{4043} = (10, 29, 2, 1)$
89 : $P_{4050} = (17, 29, 2, 1)$
90 : $P_{4077} = (12, 30, 2, 1)$
91 : $P_{4090} = (25, 30, 2, 1)$
92 : $P_{4139} = (10, 0, 3, 1)$
93 : $P_{4168} = (7, 1, 3, 1)$
94 : $P_{4201} = (8, 2, 3, 1)$
95 : $P_{4214} = (21, 2, 3, 1)$
96 : $P_{4249} = (24, 3, 3, 1)$
97 : $P_{4296} = (7, 5, 3, 1)$
98 : $P_{4307} = (18, 5, 3, 1)$
99 : $P_{4425} = (8, 9, 3, 1)$
100 : $P_{4427} = (10, 9, 3, 1)$
101 : $P_{4516} = (3, 12, 3, 1)$
102 : $P_{4532} = (19, 12, 3, 1)$
103 : $P_{4567} = (22, 13, 3, 1)$
104 : $P_{4568} = (23, 13, 3, 1)$
105 : $P_{4684} = (11, 17, 3, 1)$
106 : $P_{4687} = (14, 17, 3, 1)$
107 : $P_{4787} = (18, 20, 3, 1)$
108 : $P_{4790} = (21, 20, 3, 1)$
109 : $P_{4919} = (22, 24, 3, 1)$
110 : $P_{4921} = (24, 24, 3, 1)$
111 : $P_{4940} = (11, 25, 3, 1)$
112 : $P_{4952} = (23, 25, 3, 1)$
113 : $P_{5039} = (14, 28, 3, 1)$
114 : $P_{5044} = (19, 28, 3, 1)$
115 : $P_{5162} = (9, 0, 4, 1)$
116 : $P_{5206} = (21, 1, 4, 1)$
117 : $P_{5250} = (1, 3, 4, 1)$
118 : $P_{5272} = (23, 3, 4, 1)$
119 : $P_{5288} = (7, 4, 4, 1)$
120 : $P_{5329} = (16, 5, 4, 1)$
121 : $P_{5337} = (24, 5, 4, 1)$
122 : $P_{5346} = (1, 6, 4, 1)$
123 : $P_{5372} = (27, 6, 4, 1)$
124 : $P_{5384} = (7, 7, 4, 1)$
125 : $P_{5399} = (22, 7, 4, 1)$
126 : $P_{5578} = (9, 13, 4, 1)$
127 : $P_{5595} = (26, 13, 4, 1)$
128 : $P_{5606} = (5, 14, 4, 1)$
129 : $P_{5619} = (18, 14, 4, 1)$
130 : $P_{5638} = (5, 15, 4, 1)$
131 : $P_{5650} = (17, 15, 4, 1)$
132 : $P_{5686} = (21, 16, 4, 1)$
133 : $P_{5688} = (23, 16, 4, 1)$
134 : $P_{5703} = (6, 17, 4, 1)$
135 : $P_{5713} = (16, 17, 4, 1)$
136 : $P_{5767} = (6, 19, 4, 1)$
137 : $P_{5787} = (26, 19, 4, 1)$
138 : $P_{5797} = (4, 20, 4, 1)$
139 : $P_{5801} = (8, 20, 4, 1)$
140 : $P_{5840} = (15, 21, 4, 1)$
141 : $P_{5847} = (22, 21, 4, 1)$
142 : $P_{5869} = (12, 22, 4, 1)$
143 : $P_{5871} = (14, 22, 4, 1)$
144 : $P_{5929} = (8, 24, 4, 1)$
145 : $P_{5939} = (18, 24, 4, 1)$
146 : $P_{5977} = (24, 25, 4, 1)$
147 : $P_{5980} = (27, 25, 4, 1)$
148 : $P_{5987} = (2, 26, 4, 1)$
149 : $P_{6002} = (17, 26, 4, 1)$
150 : $P_{6051} = (2, 28, 4, 1)$
151 : $P_{6063} = (14, 28, 4, 1)$
152 : $P_{6125} = (12, 30, 4, 1)$
153 : $P_{6128} = (15, 30, 4, 1)$

$154: P_{6191} = (14, 0, 5, 1)$
$155: P_{6230} = (21, 1, 5, 1)$
$156: P_{6315} = (10, 4, 5, 1)$
$157: P_{6333} = (28, 4, 5, 1)$
$158: P_{6344} = (7, 5, 5, 1)$
$159: P_{6384} = (15, 6, 5, 1)$
$160: P_{6393} = (24, 6, 5, 1)$
$161: P_{6408} = (7, 7, 5, 1)$
$162: P_{6426} = (25, 7, 5, 1)$
$163: P_{6539} = (10, 11, 5, 1)$
$164: P_{6543} = (14, 11, 5, 1)$
$165: P_{6576} = (15, 12, 5, 1)$
$166: P_{6591} = (30, 12, 5, 1)$
$167: P_{6730} = (9, 17, 5, 1)$
$168: P_{6742} = (21, 17, 5, 1)$
$169: P_{6921} = (8, 23, 5, 1)$
$170: P_{6943} = (30, 23, 5, 1)$
$171: P_{7014} = (5, 26, 5, 1)$
$172: P_{7017} = (8, 26, 5, 1)$
$173: P_{7065} = (24, 27, 5, 1)$
$174: P_{7066} = (25, 27, 5, 1)$
$175: P_{7114} = (9, 29, 5, 1)$
$176: P_{7133} = (28, 29, 5, 1)$
$177: P_{7230} = (29, 0, 6, 1)$
$178: P_{7252} = (19, 1, 6, 1)$
$179: P_{7299} = (2, 3, 6, 1)$
$180: P_{7320} = (23, 3, 6, 1)$
$181: P_{7336} = (7, 4, 6, 1)$
$182: P_{7343} = (14, 4, 6, 1)$
$183: P_{7368} = (7, 5, 6, 1)$
$184: P_{7392} = (31, 5, 6, 1)$
$185: P_{7423} = (30, 6, 6, 1)$
$186: P_{7427} = (2, 7, 6, 1)$
$187: P_{7438} = (13, 7, 6, 1)$
$188: P_{7458} = (1, 8, 6, 1)$
$189: P_{7475} = (18, 8, 6, 1)$
$190: P_{7598} = (13, 12, 6, 1)$
$191: P_{7599} = (14, 12, 6, 1)$
$192: P_{7682} = (1, 15, 6, 1)$
$193: P_{7708} = (27, 15, 6, 1)$
$194: P_{7800} = (23, 18, 6, 1)$
$195: P_{7804} = (27, 18, 6, 1)$
$196: P_{7853} = (12, 20, 6, 1)$
$197: P_{7860} = (19, 20, 6, 1)$
$198: P_{7877} = (4, 21, 6, 1)$
$199: P_{7879} = (6, 21, 6, 1)$
$200: P_{7941} = (4, 23, 6, 1)$
$201: P_{7946} = (9, 23, 6, 1)$
$202: P_{7974} = (5, 24, 6, 1)$
$203: P_{7978} = (9, 24, 6, 1)$
$204: P_{8070} = (5, 27, 6, 1)$
$205: P_{8094} = (29, 27, 6, 1)$
$206: P_{8115} = (18, 28, 6, 1)$
$207: P_{8128} = (31, 28, 6, 1)$
$208: P_{8173} = (12, 30, 6, 1)$
$209: P_{8191} = (30, 30, 6, 1)$
$210: P_{8228} = (3, 0, 7, 1)$
$211: P_{8276} = (19, 1, 7, 1)$
$212: P_{8332} = (11, 3, 7, 1)$
$213: P_{8334} = (13, 3, 7, 1)$
$214: P_{8356} = (3, 4, 7, 1)$
$215: P_{8381} = (28, 4, 7, 1)$
$216: P_{8479} = (30, 7, 7, 1)$
$217: P_{8526} = (13, 9, 7, 1)$
$218: P_{8538} = (25, 9, 7, 1)$
$219: P_{8562} = (17, 10, 7, 1)$
$220: P_{8563} = (18, 10, 7, 1)$
$221: P_{8645} = (4, 13, 7, 1)$
$222: P_{8670} = (29, 13, 7, 1)$
$223: P_{8677} = (4, 14, 7, 1)$
$224: P_{8680} = (7, 14, 7, 1)$
$225: P_{8716} = (11, 15, 7, 1)$
$226: P_{8727} = (22, 15, 7, 1)$
$227: P_{8911} = (14, 21, 7, 1)$
$228: P_{8916} = (19, 21, 7, 1)$
$229: P_{8986} = (25, 23, 7, 1)$
$230: P_{8990} = (29, 23, 7, 1)$
$231: P_{9135} = (14, 28, 7, 1)$
$232: P_{9138} = (17, 28, 7, 1)$
$233: P_{9207} = (22, 30, 7, 1)$
$234: P_{9215} = (30, 30, 7, 1)$
$235: P_{9235} = (18, 31, 7, 1)$
$236: P_{9245} = (28, 31, 7, 1)$
$237: P_{9262} = (13, 0, 8, 1)$
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644 : $P_{22213} = (4, 21, 20, 1)$
645 : $P_{22236} = (27, 21, 20, 1)$
646 : $P_{22282} = (9, 23, 20, 1)$
647 : $P_{22291} = (18, 23, 20, 1)$
648 : $P_{22316} = (11, 24, 20, 1)$
649 : $P_{22321} = (16, 24, 20, 1)$
650 : $P_{22396} = (27, 26, 20, 1)$
651 : $P_{22399} = (30, 26, 20, 1)$
652 : $P_{22449} = (16, 28, 20, 1)$
653 : $P_{22453} = (20, 28, 20, 1)$
654 : $P_{22473} = (8, 29, 20, 1)$
655 : $P_{22491} = (26, 29, 20, 1)$
656 : $P_{22530} = (1, 31, 20, 1)$
657 : $P_{22531} = (2, 31, 20, 1)$
658 : $P_{22566} = (5, 0, 21, 1)$
659 : $P_{22601} = (8, 1, 21, 1)$
660 : $P_{22736} = (15, 5, 21, 1)$
661 : $P_{22748} = (27, 5, 21, 1)$
662 : $P_{22919} = (6, 11, 21, 1)$
663 : $P_{22940} = (27, 11, 21, 1)$
664 : $P_{23018} = (9, 14, 21, 1)$
665 : $P_{23021} = (12, 14, 21, 1)$
666 : $P_{23078} = (5, 16, 21, 1)$
667 : $P_{23096} = (23, 16, 21, 1)$
668 : $P_{23146} = (9, 18, 21, 1)$
669 : $P_{23160} = (23, 18, 21, 1)$
670 : $P_{23188} = (19, 19, 21, 1)$
671 : $P_{23194} = (25, 19, 21, 1)$
672 : $P_{23252} = (19, 21, 21, 1)$
673 : $P_{23309} = (12, 23, 21, 1)$
674 : $P_{23327} = (30, 23, 21, 1)$
675 : $P_{23335} = (6, 24, 21, 1)$
676 : $P_{23351} = (22, 24, 21, 1)$
677 : $P_{23441} = (16, 27, 21, 1)$
678 : $P_{23447} = (22, 27, 21, 1)$
679 : $P_{23465} = (8, 28, 21, 1)$
680 : $P_{23487} = (30, 28, 21, 1)$
681 : $P_{23537} = (16, 30, 21, 1)$
682 : $P_{23542} = (21, 30, 21, 1)$
683 : $P_{23568} = (15, 31, 21, 1)$
684 : $P_{23578} = (25, 31, 21, 1)$
685 : $P_{23591} = (6, 0, 22, 1)$
686 : $P_{23631} = (14, 1, 22, 1)$
687 : $P_{23749} = (4, 5, 22, 1)$
688 : $P_{23753} = (8, 5, 22, 1)$
689 : $P_{23820} = (11, 7, 22, 1)$
690 : $P_{23824} = (15, 7, 22, 1)$
691 : $P_{23874} = (1, 9, 22, 1)$
692 : $P_{23889} = (16, 9, 22, 1)$
693 : $P_{23910} = (5, 10, 22, 1)$

694 : $P_{23915} = (10, 10, 22, 1)$
695 : $P_{23982} = (13, 12, 22, 1)$
696 : $P_{23990} = (21, 12, 22, 1)$
697 : $P_{24081} = (16, 15, 22, 1)$
698 : $P_{24086} = (21, 15, 22, 1)$
699 : $P_{24103} = (6, 16, 22, 1)$
700 : $P_{24123} = (26, 16, 22, 1)$
701 : $P_{24284} = (27, 21, 22, 1)$
702 : $P_{24288} = (31, 21, 22, 1)$
703 : $P_{24299} = (10, 22, 22, 1)$
704 : $P_{24325} = (4, 23, 22, 1)$
705 : $P_{24334} = (13, 23, 22, 1)$
706 : $P_{24375} = (22, 24, 22, 1)$
707 : $P_{24380} = (27, 24, 22, 1)$
708 : $P_{24390} = (5, 25, 22, 1)$
709 : $P_{24399} = (14, 25, 22, 1)$
710 : $P_{24428} = (11, 26, 22, 1)$
711 : $P_{24440} = (23, 26, 22, 1)$
712 : $P_{24457} = (8, 27, 22, 1)$
713 : $P_{24472} = (23, 27, 22, 1)$
714 : $P_{24507} = (26, 28, 22, 1)$
715 : $P_{24512} = (31, 28, 22, 1)$
716 : $P_{24546} = (1, 30, 22, 1)$
717 : $P_{24560} = (15, 30, 22, 1)$
718 : $P_{24621} = (12, 0, 23, 1)$
719 : $P_{24655} = (14, 1, 23, 1)$
720 : $P_{24743} = (6, 4, 23, 1)$
721 : $P_{24764} = (27, 4, 23, 1)$
722 : $P_{24836} = (3, 7, 23, 1)$
723 : $P_{24841} = (8, 7, 23, 1)$
724 : $P_{24888} = (23, 8, 23, 1)$
725 : $P_{24892} = (27, 8, 23, 1)$
726 : $P_{24915} = (18, 9, 23, 1)$
727 : $P_{24917} = (20, 9, 23, 1)$
728 : $P_{24939} = (10, 10, 23, 1)$
729 : $P_{24949} = (20, 10, 23, 1)$
730 : $P_{24968} = (7, 11, 23, 1)$
731 : $P_{24976} = (15, 11, 23, 1)$
732 : $P_{24997} = (4, 12, 23, 1)$
733 : $P_{25011} = (18, 12, 23, 1)$
734 : $P_{25220} = (3, 19, 23, 1)$
735 : $P_{25232} = (15, 19, 23, 1)$
736 : $P_{25287} = (6, 21, 23, 1)$
737 : $P_{25310} = (29, 21, 23, 1)$
738 : $P_{25355} = (10, 23, 23, 1)$
739 : $P_{25385} = (8, 24, 23, 1)$
740 : $P_{25391} = (14, 24, 23, 1)$
741 : $P_{25480} = (7, 27, 23, 1)$
742 : $P_{25485} = (12, 27, 23, 1)$
743 : $P_{25605} = (4, 31, 23, 1)$
744 : $P_{25630} = (29, 31, 23, 1)$
745 : $P_{25659} = (26, 0, 24, 1)$
746 : $P_{25695} = (30, 1, 24, 1)$
747 : $P_{25718} = (21, 2, 24, 1)$
748 : $P_{25723} = (26, 2, 24, 1)$
749 : $P_{25867} = (10, 7, 24, 1)$
750 : $P_{25887} = (30, 7, 24, 1)$
751 : $P_{25894} = (5, 8, 24, 1)$
752 : $P_{25920} = (31, 8, 24, 1)$
753 : $P_{25955} = (2, 10, 24, 1)$
754 : $P_{25977} = (24, 10, 24, 1)$
755 : $P_{25994} = (9, 11, 24, 1)$
756 : $P_{26014} = (29, 11, 24, 1)$
757 : $P_{26095} = (14, 14, 24, 1)$
758 : $P_{26110} = (29, 14, 24, 1)$
759 : $P_{26134} = (21, 15, 24, 1)$
760 : $P_{26144} = (31, 15, 24, 1)$
761 : $P_{26147} = (2, 16, 24, 1)$
762 : $P_{26165} = (20, 16, 24, 1)$
763 : $P_{26225} = (16, 18, 24, 1)$
764 : $P_{26231} = (22, 18, 24, 1)$
765 : $P_{26310} = (5, 21, 24, 1)$
766 : $P_{26315} = (10, 21, 24, 1)$
767 : $P_{26415} = (14, 24, 24, 1)$
768 : $P_{26474} = (9, 26, 24, 1)$
769 : $P_{26481} = (16, 26, 24, 1)$
770 : $P_{26549} = (20, 28, 24, 1)$
771 : $P_{26551} = (22, 28, 24, 1)$
772 : $P_{26677} = (20, 0, 25, 1)$
773 : $P_{26719} = (30, 1, 25, 1)$
774 : $P_{26731} = (10, 2, 25, 1)$
775 : $P_{26745} = (24, 2, 25, 1)$
776 : $P_{26768} = (15, 3, 25, 1)$
777 : $P_{26777} = (24, 3, 25, 1)$
778 : $P_{26866} = (17, 6, 25, 1)$
779 : $P_{26879} = (30, 6, 25, 1)$
780 : $P_{26883} = (2, 7, 25, 1)$
781 : $P_{26906} = (25, 7, 25, 1)$
782 : $P_{27010} = (1, 11, 25, 1)$
783 : $P_{27022} = (13, 11, 25, 1)$
784 : $P_{27076} = (3, 13, 25, 1)$
785 : $P_{27093} = (20, 13, 25, 1)$
786 : $P_{27119} = (14, 14, 25, 1)$
787 : $P_{27122} = (17, 14, 25, 1)$
788 : $P_{27211} = (10, 17, 25, 1)$
789 : $P_{27217} = (16, 17, 25, 1)$
790 : $P_{27266} = (1, 19, 25, 1)$
791 : $P_{27296} = (31, 19, 25, 1)$
792 : $P_{27344} = (15, 21, 25, 1)$
793 : $P_{27360} = (31, 21, 25, 1)$
794 : $P_{27396} = (3, 23, 25, 1)$
795 : $P_{27411} = (18, 23, 25, 1)$
796 : $P_{27441} = (16, 24, 25, 1)$
797 : $P_{27452} = (27, 24, 25, 1)$
798 : $P_{27471} = (14, 25, 25, 1)$
799 : $P_{27516} = (27, 26, 25, 1)$
800 : $P_{27517} = (28, 26, 25, 1)$
801 : $P_{27555} = (2, 28, 25, 1)$

802 : $P_{27571} = (18, 28, 25, 1)$
803 : $P_{27662} = (13, 31, 25, 1)$
804 : $P_{27677} = (28, 31, 25, 1)$
805 : $P_{27689} = (8, 0, 26, 1)$
806 : $P_{27737} = (24, 1, 26, 1)$
807 : $P_{27801} = (24, 3, 26, 1)$
808 : $P_{27808} = (31, 3, 26, 1)$
809 : $P_{27850} = (9, 5, 26, 1)$
810 : $P_{27851} = (10, 5, 26, 1)$
811 : $P_{27880} = (7, 6, 26, 1)$
812 : $P_{27904} = (31, 6, 26, 1)$
813 : $P_{28221} = (28, 16, 26, 1)$
814 : $P_{28222} = (29, 16, 26, 1)$
815 : $P_{28251} = (26, 17, 26, 1)$
816 : $P_{28255} = (30, 17, 26, 1)$
817 : $P_{28265} = (8, 18, 26, 1)$
818 : $P_{28276} = (19, 18, 26, 1)$
819 : $P_{28363} = (10, 21, 26, 1)$
820 : $P_{28383} = (30, 21, 26, 1)$
821 : $P_{28394} = (9, 22, 26, 1)$
822 : $P_{28413} = (28, 22, 26, 1)$
823 : $P_{28440} = (23, 23, 26, 1)$
824 : $P_{28446} = (29, 23, 26, 1)$
825 : $P_{28536} = (23, 26, 26, 1)$
826 : $P_{28552} = (7, 27, 26, 1)$
827 : $P_{28564} = (19, 27, 26, 1)$
828 : $P_{28736} = (31, 0, 27, 1)$
829 : $P_{28761} = (24, 1, 27, 1)$
830 : $P_{28790} = (21, 2, 27, 1)$
831 : $P_{28793} = (24, 2, 27, 1)$
832 : $P_{28803} = (2, 3, 27, 1)$
833 : $P_{28823} = (22, 3, 27, 1)$
834 : $P_{28850} = (17, 4, 27, 1)$
835 : $P_{28864} = (31, 4, 27, 1)$
836 : $P_{28937} = (8, 7, 27, 1)$
837 : $P_{28942} = (13, 7, 27, 1)$
838 : $P_{28976} = (15, 8, 27, 1)$
839 : $P_{28987} = (26, 8, 27, 1)$
840 : $P_{28996} = (3, 9, 27, 1)$
841 : $P_{29019} = (26, 9, 27, 1)$
842 : $P_{29030} = (5, 10, 27, 1)$
843 : $P_{29034} = (9, 10, 27, 1)$
844 : $P_{29090} = (1, 12, 27, 1)$
845 : $P_{29110} = (21, 12, 27, 1)$
846 : $P_{29170} = (17, 14, 27, 1)$
847 : $P_{29175} = (22, 14, 27, 1)$
848 : $P_{29252} = (3, 17, 27, 1)$
849 : $P_{29262} = (13, 17, 27, 1)$
850 : $P_{29350} = (5, 20, 27, 1)$
851 : $P_{29353} = (8, 20, 27, 1)$
852 : $P_{29410} = (1, 22, 27, 1)$
853 : $P_{29425} = (16, 22, 27, 1)$
854 : $P_{29461} = (20, 23, 27, 1)$
855 : $P_{29464} = (23, 23, 27, 1)$
856 : $P_{29482} = (9, 24, 27, 1)$
857 : $P_{29493} = (20, 24, 27, 1)$
858 : $P_{29532} = (27, 25, 27, 1)$
859 : $P_{29535} = (30, 25, 27, 1)$
860 : $P_{29539} = (2, 26, 27, 1)$
861 : $P_{29565} = (28, 26, 27, 1)$
862 : $P_{29592} = (23, 27, 27, 1)$
863 : $P_{29616} = (15, 28, 27, 1)$
864 : $P_{29631} = (30, 28, 27, 1)$
865 : $P_{29649} = (16, 29, 27, 1)$
866 : $P_{29661} = (28, 29, 27, 1)$
867 : $P_{29746} = (17, 0, 28, 1)$
868 : $P_{29771} = (10, 1, 28, 1)$
869 : $P_{29806} = (13, 2, 28, 1)$
870 : $P_{29818} = (25, 2, 28, 1)$
871 : $P_{29973} = (20, 7, 28, 1)$
872 : $P_{29978} = (25, 7, 28, 1)$
873 : $P_{29991} = (6, 8, 28, 1)$
874 : $P_{29993} = (8, 8, 28, 1)$
875 : $P_{30028} = (11, 9, 28, 1)$
876 : $P_{30041} = (24, 9, 28, 1)$
877 : $P_{30162} = (17, 13, 28, 1)$
878 : $P_{30169} = (24, 13, 28, 1)$
879 : $P_{30211} = (2, 15, 28, 1)$
880 : $P_{30229} = (20, 15, 28, 1)$
881 : $P_{30275} = (2, 17, 28, 1)$
882 : $P_{30304} = (31, 17, 28, 1)$
883 : $P_{30311} = (6, 18, 28, 1)$
884 : $P_{30336} = (31, 18, 28, 1)$
885 : $P_{30350} = (13, 19, 28, 1)$
886 : $P_{30365} = (28, 19, 28, 1)$
887 : $P_{30475} = (10, 23, 28, 1)$
888 : $P_{30484} = (19, 23, 28, 1)$
889 : $P_{30516} = (19, 24, 28, 1)$
890 : $P_{30523} = (26, 24, 28, 1)$
891 : $P_{30633} = (8, 28, 28, 1)$
892 : $P_{30700} = (11, 30, 28, 1)$
893 : $P_{30715} = (26, 30, 28, 1)$
894 : $P_{30778} = (25, 0, 29, 1)$
895 : $P_{30795} = (10, 1, 29, 1)$
896 : $P_{30851} = (2, 3, 29, 1)$
897 : $P_{30868} = (19, 3, 29, 1)$
898 : $P_{30893} = (12, 4, 29, 1)$
899 : $P_{30906} = (25, 4, 29, 1)$
900 : $P_{30990} = (13, 7, 29, 1)$
901 : $P_{30992} = (15, 7, 29, 1)$
902 : $P_{31012} = (3, 8, 29, 1)$
903 : $P_{31017} = (8, 8, 29, 1)$
904 : $P_{31109} = (4, 11, 29, 1)$
905 : $P_{31112} = (7, 11, 29, 1)$
906 : $P_{31146} = (9, 12, 29, 1)$
907 : $P_{31165} = (28, 12, 29, 1)$
908 : $P_{31188} = (19, 13, 29, 1)$
909 : $P_{31197} = (28, 13, 29, 1)$

910 : $P_{31202} = (1, 14, 29, 1)$
911 : $P_{31212} = (11, 14, 29, 1)$
912 : $P_{31304} = (7, 17, 29, 1)$
913 : $P_{31313} = (16, 17, 29, 1)$
914 : $P_{31330} = (1, 18, 29, 1)$
915 : $P_{31333} = (4, 18, 29, 1)$
916 : $P_{31437} = (12, 21, 29, 1)$
917 : $P_{31440} = (15, 21, 29, 1)$
918 : $P_{31460} = (3, 22, 29, 1)$
919 : $P_{31467} = (10, 22, 29, 1)$
920 : $P_{31502} = (13, 23, 29, 1)$
921 : $P_{31518} = (29, 23, 29, 1)$
922 : $P_{31530} = (9, 24, 29, 1)$
923 : $P_{31532} = (11, 24, 29, 1)$
924 : $P_{31651} = (2, 28, 29, 1)$
925 : $P_{31665} = (16, 28, 29, 1)$
926 : $P_{31689} = (8, 29, 29, 1)$
927 : $P_{31781} = (4, 0, 30, 1)$
928 : $P_{31821} = (12, 1, 30, 1)$
929 : $P_{31846} = (5, 2, 30, 1)$
930 : $P_{31855} = (14, 2, 30, 1)$
931 : $P_{31972} = (3, 6, 30, 1)$
932 : $P_{31979} = (10, 6, 30, 1)$
933 : $P_{32042} = (9, 8, 30, 1)$
934 : $P_{32046} = (13, 8, 30, 1)$
935 : $P_{32338} = (17, 17, 30, 1)$
936 : $P_{32345} = (24, 17, 30, 1)$
937 : $P_{32363} = (10, 18, 30, 1)$
938 : $P_{32367} = (14, 18, 30, 1)$
939 : $P_{32397} = (12, 19, 30, 1)$
940 : $P_{32412} = (27, 19, 30, 1)$
941 : $P_{32508} = (27, 22, 30, 1)$
942 : $P_{32511} = (30, 22, 30, 1)$
943 : $P_{32532} = (19, 23, 30, 1)$
944 : $P_{32537} = (24, 23, 30, 1)$
945 : $P_{32582} = (5, 25, 30, 1)$
946 : $P_{32603} = (26, 25, 30, 1)$
947 : $P_{32613} = (4, 26, 30, 1)$
948 : $P_{32628} = (19, 26, 30, 1)$
949 : $P_{32644} = (3, 27, 30, 1)$
950 : $P_{32654} = (13, 27, 30, 1)$
951 : $P_{32731} = (26, 29, 30, 1)$
952 : $P_{32733} = (28, 29, 30, 1)$
953 : $P_{32754} = (17, 30, 30, 1)$
954 : $P_{32778} = (9, 31, 30, 1)$
955 : $P_{32797} = (28, 31, 30, 1)$
956 : $P_{32822} = (21, 0, 31, 1)$
957 : $P_{32845} = (12, 1, 31, 1)$
958 : $P_{32866} = (1, 2, 31, 1)$
959 : $P_{32888} = (23, 2, 31, 1)$
960 : $P_{32905} = (8, 3, 31, 1)$
961 : $P_{32923} = (26, 3, 31, 1)$
962 : $P_{33019} = (26, 6, 31, 1)$
963 : $P_{33023} = (30, 6, 31, 1)$
964 : $P_{33027} = (2, 7, 31, 1)$
965 : $P_{33055} = (30, 7, 31, 1)$
966 : $P_{33081} = (24, 8, 31, 1)$
967 : $P_{33082} = (25, 8, 31, 1)$
968 : $P_{33142} = (21, 10, 31, 1)$
969 : $P_{33144} = (23, 10, 31, 1)$
970 : $P_{33222} = (5, 13, 31, 1)$
971 : $P_{33223} = (6, 13, 31, 1)$
972 : $P_{33260} = (11, 14, 31, 1)$
973 : $P_{33274} = (25, 14, 31, 1)$
974 : $P_{33288} = (7, 15, 31, 1)$
975 : $P_{33305} = (24, 15, 31, 1)$
976 : $P_{33362} = (17, 17, 31, 1)$
977 : $P_{33363} = (18, 17, 31, 1)$
978 : $P_{33389} = (12, 18, 31, 1)$
979 : $P_{33397} = (20, 18, 31, 1)$
980 : $P_{33447} = (6, 20, 31, 1)$
981 : $P_{33449} = (8, 20, 31, 1)$
982 : $P_{33542} = (5, 23, 31, 1)$
983 : $P_{33544} = (7, 23, 31, 1)$
984 : $P_{33621} = (20, 25, 31, 1)$
985 : $P_{33628} = (27, 25, 31, 1)$
986 : $P_{33635} = (2, 26, 31, 1)$
987 : $P_{33644} = (11, 26, 31, 1)$
988 : $P_{33698} = (1, 28, 31, 1)$
989 : $P_{33715} = (18, 28, 31, 1)$
990 : $P_{33756} = (27, 29, 31, 1)$
991 : $P_{33760} = (31, 29, 31, 1)$
992 : $P_{33810} = (17, 31, 31, 1)$

## Line Intersection Graph

| | 0 1 2 |
|---|---|
| 0 | 0 1 1 |
| 1 | 1 0 1 |
| 2 | 1 1 0 |

Neighbor sets in the line intersection graph:
Line 0 intersects

| Line | $\ell_1$ | $\ell_2$ |
|---|---|---|
| in point | $P_{2114}$ | $P_4$ |

Line 1 intersects

| Line | $\ell_0$ | $\ell_2$ |
|---|---|---|
| in point | $P_{2114}$ | $P_{2082}$ |

Line 2 intersects

| Line | $\ell_0$ | $\ell_1$ |
|---|---|---|
| in point | $P_4$ | $P_{2082}$ |

The surface has 1089 points:
Too many to print.