Rank-65548 over GF(32)

January 15, 2021

The equation

The equation of the surface is :

$$X_0^3 + X_3^3 + X_0X_1X_2 = 0$$

(1, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0)
The point rank of the equation over GF(32) is 1108411430

General information

Number of lines	3
Number of points	1057
Number of singular points	2
Number of Eckardt points	0
Number of double points	3
Number of single points	93
Number of points off lines	961
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^{961}

Singular Points

The surface has 2 singular points:

$0: \ P_1 = \mathbf{P}(0,1,0,0) = \mathbf{P}(0,1,0,0)$
$1: \ P_2 = \mathbf{P}(0,0,1,0) = \mathbf{P}(0,0,1,0)$

The 3 Lines

The lines and their Pluecker coordinates are:

$$\ell_0 = \left[\begin{array}{cccc} 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \end{array}\right]_{1082368} = \left[\begin{array}{cccc} 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \end{array}\right]_{1082368} = \mathbf{Pl}(0,0,0,0,0,1)_{34849}$$

$$\ell_1 = \begin{bmatrix} 1 & 0 & 0 & 1 \\ 0 & 1 & 0 & 0 \end{bmatrix}_{33824} = \begin{bmatrix} 1 & 0 & 0 & 1 \\ 0 & 1 & 0 & 0 \end{bmatrix}_{33824} = \mathbf{Pl}(1,0,0,1,0,0)_{66}$$

$$\ell_2 = \begin{bmatrix} 1 & 0 & 0 & 1 \\ 0 & 0 & 1 & 0 \end{bmatrix}_{34848} = \begin{bmatrix} 1 & 0 & 0 & 1 \\ 0 & 0 & 1 & 0 \end{bmatrix}_{34848} = \mathbf{Pl}(0,1,1,0,0,0)_{34}$$

Rank of lines: (1082368, 33824, 34848)
Rank of points on Klein quadric: (34849, 66, 34)

Eckardt Points

The surface has 0 Eckardt points:

Double Points

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

$P_1 = (0,1,0,0) = \ell_0 \cap \ell_1$
$P_2 = (0,0,1,0) = \ell_0 \cap \ell_2$
$P_{1059} = (1,0,0,1) = \ell_1 \cap \ell_2$

Single Points

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

0 : $P_{67} = (0,1,1,0)$ lies on line ℓ_0
1 : $P_{99} = (0,2,1,0)$ lies on line ℓ_0
2 : $P_{131} = (0,3,1,0)$ lies on line ℓ_0
3 : $P_{163} = (0,4,1,0)$ lies on line ℓ_0
4 : $P_{195} = (0,5,1,0)$ lies on line ℓ_0
5 : $P_{227} = (0,6,1,0)$ lies on line ℓ_0
6 : $P_{259} = (0,7,1,0)$ lies on line ℓ_0
7 : $P_{291} = (0,8,1,0)$ lies on line ℓ_0
8 : $P_{323} = (0,9,1,0)$ lies on line ℓ_0
9 : $P_{355} = (0,10,1,0)$ lies on line ℓ_0
10 : $P_{387} = (0,11,1,0)$ lies on line ℓ_0
11 : $P_{419} = (0,12,1,0)$ lies on line ℓ_0
12 : $P_{451} = (0,13,1,0)$ lies on line ℓ_0
13 : $P_{483} = (0,14,1,0)$ lies on line ℓ_0
14 : $P_{515} = (0,15,1,0)$ lies on line ℓ_0
15 : $P_{547} = (0,16,1,0)$ lies on line ℓ_0
16 : $P_{579} = (0,17,1,0)$ lies on line ℓ_0
17 : $P_{611} = (0,18,1,0)$ lies on line ℓ_0
18 : $P_{643} = (0,19,1,0)$ lies on line ℓ_0
19 : $P_{675} = (0,20,1,0)$ lies on line ℓ_0
20 : $P_{707} = (0,21,1,0)$ lies on line ℓ_0
21 : $P_{739} = (0,22,1,0)$ lies on line ℓ_0
22 : $P_{771} = (0,23,1,0)$ lies on line ℓ_0
23 : $P_{803} = (0,24,1,0)$ lies on line ℓ_0
24 : $P_{835} = (0,25,1,0)$ lies on line ℓ_0
25 : $P_{867} = (0,26,1,0)$ lies on line ℓ_0
26 : $P_{899} = (0,27,1,0)$ lies on line ℓ_0
27 : $P_{931} = (0,28,1,0)$ lies on line ℓ_0
28 : $P_{963} = (0,29,1,0)$ lies on line ℓ_0
29 : $P_{995} = (0,30,1,0)$ lies on line ℓ_0
30 : $P_{1027} = (0,31,1,0)$ lies on line ℓ_0
31 : $P_{1091} = (1,1,0,1)$ lies on line ℓ_1
32 : $P_{1123} = (1,2,0,1)$ lies on line ℓ_1
33 : $P_{1155} = (1,3,0,1)$ lies on line ℓ_1
34 : $P_{1187} = (1,4,0,1)$ lies on line ℓ_1
35 : $P_{1219} = (1,5,0,1)$ lies on line ℓ_1
36 : $P_{1251} = (1,6,0,1)$ lies on line ℓ_1
37 : $P_{1283} = (1,7,0,1)$ lies on line ℓ_1
38 : $P_{1315} = (1,8,0,1)$ lies on line ℓ_1
39 : $P_{1347} = (1,9,0,1)$ lies on line ℓ_1
40 : $P_{1379} = (1,10,0,1)$ lies on line ℓ_1
41 : $P_{1411} = (1,11,0,1)$ lies on line ℓ_1
42 : $P_{1443} = (1,12,0,1)$ lies on line ℓ_1
43 : $P_{1475} = (1,13,0,1)$ lies on line ℓ_1
44 : $P_{1507} = (1,14,0,1)$ lies on line ℓ_1
45 : $P_{1539} = (1,15,0,1)$ lies on line ℓ_1
46 : $P_{1571} = (1,16,0,1)$ lies on line ℓ_1
47 : $P_{1603} = (1,17,0,1)$ lies on line ℓ_1
48 : $P_{1635} = (1,18,0,1)$ lies on line ℓ_1
49 : $P_{1667} = (1,19,0,1)$ lies on line ℓ_1
50 : $P_{1699} = (1,20,0,1)$ lies on line ℓ_1
51 : $P_{1731} = (1,21,0,1)$ lies on line ℓ_1

52 : $P_{1763} = (1, 22, 0, 1)$ lies on line ℓ_1
53 : $P_{1795} = (1, 23, 0, 1)$ lies on line ℓ_1
54 : $P_{1827} = (1, 24, 0, 1)$ lies on line ℓ_1
55 : $P_{1859} = (1, 25, 0, 1)$ lies on line ℓ_1
56 : $P_{1891} = (1, 26, 0, 1)$ lies on line ℓ_1
57 : $P_{1923} = (1, 27, 0, 1)$ lies on line ℓ_1
58 : $P_{1955} = (1, 28, 0, 1)$ lies on line ℓ_1
59 : $P_{1987} = (1, 29, 0, 1)$ lies on line ℓ_1
60 : $P_{2019} = (1, 30, 0, 1)$ lies on line ℓ_1
61 : $P_{2051} = (1, 31, 0, 1)$ lies on line ℓ_1
62 : $P_{2083} = (1, 0, 1, 1)$ lies on line ℓ_2
63 : $P_{3106} = (1, 0, 2, 1)$ lies on line ℓ_2
64 : $P_{4130} = (1, 0, 3, 1)$ lies on line ℓ_2
65 : $P_{5154} = (1, 0, 4, 1)$ lies on line ℓ_2
66 : $P_{6178} = (1, 0, 5, 1)$ lies on line ℓ_2
67 : $P_{7202} = (1, 0, 6, 1)$ lies on line ℓ_2
68 : $P_{8226} = (1, 0, 7, 1)$ lies on line ℓ_2
69 : $P_{9250} = (1, 0, 8, 1)$ lies on line ℓ_2
70 : $P_{10274} = (1, 0, 9, 1)$ lies on line ℓ_2
71 : $P_{11298} = (1, 0, 10, 1)$ lies on line ℓ_2
72 : $P_{12322} = (1, 0, 11, 1)$ lies on line ℓ_2
73 : $P_{13346} = (1, 0, 12, 1)$ lies on line ℓ_2
74 : $P_{14370} = (1, 0, 13, 1)$ lies on line ℓ_2
75 : $P_{15394} = (1, 0, 14, 1)$ lies on line ℓ_2
76 : $P_{16418} = (1, 0, 15, 1)$ lies on line ℓ_2
77 : $P_{17442} = (1, 0, 16, 1)$ lies on line ℓ_2
78 : $P_{18466} = (1, 0, 17, 1)$ lies on line ℓ_2
79 : $P_{19490} = (1, 0, 18, 1)$ lies on line ℓ_2
80 : $P_{20514} = (1, 0, 19, 1)$ lies on line ℓ_2
81 : $P_{21538} = (1, 0, 20, 1)$ lies on line ℓ_2
82 : $P_{22562} = (1, 0, 21, 1)$ lies on line ℓ_2
83 : $P_{23586} = (1, 0, 22, 1)$ lies on line ℓ_2
84 : $P_{24610} = (1, 0, 23, 1)$ lies on line ℓ_2
85 : $P_{25634} = (1, 0, 24, 1)$ lies on line ℓ_2
86 : $P_{26658} = (1, 0, 25, 1)$ lies on line ℓ_2
87 : $P_{27682} = (1, 0, 26, 1)$ lies on line ℓ_2
88 : $P_{28706} = (1, 0, 27, 1)$ lies on line ℓ_2
89 : $P_{29730} = (1, 0, 28, 1)$ lies on line ℓ_2
90 : $P_{30754} = (1, 0, 29, 1)$ lies on line ℓ_2
91 : $P_{31778} = (1, 0, 30, 1)$ lies on line ℓ_2
92 : $P_{32802} = (1, 0, 31, 1)$ lies on line ℓ_2

The single points on the surface are:

Points on surface but on no line

The surface has 961 points not on any line:
The points on the surface but not on lines are:

0 : $P_{68} = (1, 1, 1, 0)$
1 : $P_{126} = (27, 2, 1, 0)$
2 : $P_{157} = (26, 3, 1, 0)$
3 : $P_{165} = (2, 4, 1, 0)$
4 : $P_{198} = (3, 5, 1, 0)$
5 : $P_{252} = (25, 6, 1, 0)$
6 : $P_{283} = (24, 7, 1, 0)$
7 : $P_{310} = (19, 8, 1, 0)$
8 : $P_{341} = (18, 9, 1, 0)$
9 : $P_{363} = (8, 10, 1, 0)$
10 : $P_{396} = (9, 11, 1, 0)$
11 : $P_{436} = (17, 12, 1, 0)$
12 : $P_{467} = (16, 13, 1, 0)$
13 : $P_{493} = (10, 14, 1, 0)$
14 : $P_{526} = (11, 15, 1, 0)$
15 : $P_{551} = (4, 16, 1, 0)$
16 : $P_{584} = (5, 17, 1, 0)$
17 : $P_{642} = (31, 18, 1, 0)$
18 : $P_{673} = (30, 19, 1, 0)$
19 : $P_{681} = (6, 20, 1, 0)$
20 : $P_{714} = (7, 21, 1, 0)$
21 : $P_{768} = (29, 22, 1, 0)$
22 : $P_{799} = (28, 23, 1, 0)$
23 : $P_{826} = (23, 24, 1, 0)$
24 : $P_{857} = (22, 25, 1, 0)$
25 : $P_{879} = (12, 26, 1, 0)$
26 : $P_{912} = (13, 27, 1, 0)$
27 : $P_{952} = (21, 28, 1, 0)$
28 : $P_{983} = (20, 29, 1, 0)$
29 : $P_{1009} = (14, 30, 1, 0)$
30 : $P_{1042} = (15, 31, 1, 0)$
31 : $P_{2197} = (20, 3, 1, 1)$
32 : $P_{2270} = (29, 5, 1, 1)$
33 : $P_{2278} = (5, 6, 1, 1)$
34 : $P_{2289} = (16, 6, 1, 1)$
35 : $P_{2294} = (21, 6, 1, 1)$
36 : $P_{2335} = (30, 7, 1, 1)$
37 : $P_{2400} = (31, 9, 1, 1)$
38 : $P_{2451} = (18, 11, 1, 1)$
39 : $P_{2490} = (25, 12, 1, 1)$
40 : $P_{2570} = (9, 15, 1, 1)$
41 : $P_{2647} = (22, 17, 1, 1)$
42 : $P_{2672} = (15, 18, 1, 1)$
43 : $P_{2734} = (13, 20, 1, 1)$
44 : $P_{2738} = (17, 20, 1, 1)$
45 : $P_{2749} = (28, 20, 1, 1)$

46 : $P_{2772} = (19, 21, 1, 1)$
47 : $P_{2787} = (2, 22, 1, 1)$
48 : $P_{2809} = (24, 22, 1, 1)$
49 : $P_{2811} = (26, 22, 1, 1)$
50 : $P_{2827} = (10, 23, 1, 1)$
51 : $P_{2863} = (14, 24, 1, 1)$
52 : $P_{2884} = (3, 25, 1, 1)$
53 : $P_{2885} = (4, 25, 1, 1)$
54 : $P_{2888} = (7, 25, 1, 1)$
55 : $P_{2919} = (6, 26, 1, 1)$
56 : $P_{2985} = (8, 28, 1, 1)$
57 : $P_{3021} = (12, 29, 1, 1)$
58 : $P_{3032} = (23, 29, 1, 1)$
59 : $P_{3036} = (27, 29, 1, 1)$
60 : $P_{3084} = (11, 31, 1, 1)$
61 : $P_{3206} = (5, 3, 2, 1)$
62 : $P_{3217} = (16, 3, 2, 1)$
63 : $P_{3222} = (21, 3, 2, 1)$
64 : $P_{3322} = (25, 6, 2, 1)$
65 : $P_{3408} = (15, 9, 2, 1)$
66 : $P_{3438} = (13, 10, 2, 1)$
67 : $P_{3442} = (17, 10, 2, 1)$
68 : $P_{3453} = (28, 10, 2, 1)$
69 : $P_{3459} = (2, 11, 2, 1)$
70 : $P_{3481} = (24, 11, 2, 1)$
71 : $P_{3483} = (26, 11, 2, 1)$
72 : $P_{3503} = (14, 12, 2, 1)$
73 : $P_{3527} = (6, 13, 2, 1)$
74 : $P_{3561} = (8, 14, 2, 1)$
75 : $P_{3646} = (29, 16, 2, 1)$
76 : $P_{3679} = (30, 17, 2, 1)$
77 : $P_{3733} = (20, 19, 2, 1)$
78 : $P_{3786} = (9, 21, 2, 1)$
79 : $P_{3840} = (31, 22, 2, 1)$
80 : $P_{3859} = (18, 23, 2, 1)$
81 : $P_{3892} = (19, 24, 2, 1)$
82 : $P_{3915} = (10, 25, 2, 1)$
83 : $P_{3959} = (22, 26, 2, 1)$
84 : $P_{4013} = (12, 28, 2, 1)$
85 : $P_{4024} = (23, 28, 2, 1)$
86 : $P_{4028} = (27, 28, 2, 1)$
87 : $P_{4044} = (11, 29, 2, 1)$
88 : $P_{4068} = (3, 30, 2, 1)$
89 : $P_{4069} = (4, 30, 2, 1)$
90 : $P_{4072} = (7, 30, 2, 1)$
91 : $P_{4181} = (20, 1, 3, 1)$
92 : $P_{4198} = (5, 2, 3, 1)$
93 : $P_{4209} = (16, 2, 3, 1)$
94 : $P_{4214} = (21, 2, 3, 1)$
95 : $P_{4254} = (29, 3, 3, 1)$
96 : $P_{4282} = (25, 4, 3, 1)$
97 : $P_{4298} = (9, 5, 3, 1)$
98 : $P_{4384} = (31, 7, 3, 1)$
99 : $P_{4399} = (14, 8, 3, 1)$
100 : $P_{4493} = (12, 11, 3, 1)$
101 : $P_{4504} = (23, 11, 3, 1)$
102 : $P_{4508} = (27, 11, 3, 1)$
103 : $P_{4526} = (13, 12, 3, 1)$
104 : $P_{4530} = (17, 12, 3, 1)$
105 : $P_{4541} = (28, 12, 3, 1)$
106 : $P_{4555} = (10, 13, 3, 1)$
107 : $P_{4592} = (15, 14, 3, 1)$
108 : $P_{4631} = (22, 15, 3, 1)$
109 : $P_{4660} = (19, 16, 3, 1)$
110 : $P_{4675} = (2, 17, 3, 1)$
111 : $P_{4697} = (24, 17, 3, 1)$
112 : $P_{4699} = (26, 17, 3, 1)$
113 : $P_{4772} = (3, 20, 3, 1)$
114 : $P_{4773} = (4, 20, 3, 1)$
115 : $P_{4776} = (7, 20, 3, 1)$
116 : $P_{4807} = (6, 21, 3, 1)$
117 : $P_{4844} = (11, 22, 3, 1)$
118 : $P_{4873} = (8, 23, 3, 1)$
119 : $P_{4979} = (18, 26, 3, 1)$
120 : $P_{5119} = (30, 30, 3, 1)$
121 : $P_{5274} = (25, 3, 4, 1)$
122 : $P_{5326} = (13, 5, 4, 1)$
123 : $P_{5330} = (17, 5, 4, 1)$
124 : $P_{5341} = (28, 5, 4, 1)$
125 : $P_{5359} = (14, 6, 4, 1)$
126 : $P_{5385} = (8, 7, 4, 1)$
127 : $P_{5438} = (29, 8, 4, 1)$
128 : $P_{5536} = (31, 11, 4, 1)$
129 : $P_{5556} = (19, 12, 4, 1)$
130 : $P_{5591} = (22, 13, 4, 1)$
131 : $P_{5613} = (12, 14, 4, 1)$
132 : $P_{5624} = (23, 14, 4, 1)$
133 : $P_{5628} = (27, 14, 4, 1)$
134 : $P_{5636} = (3, 15, 4, 1)$
135 : $P_{5637} = (4, 15, 4, 1)$
136 : $P_{5640} = (7, 15, 4, 1)$
137 : $P_{5766} = (5, 19, 4, 1)$
138 : $P_{5777} = (16, 19, 4, 1)$
139 : $P_{5782} = (21, 19, 4, 1)$
140 : $P_{5799} = (6, 20, 4, 1)$
141 : $P_{5872} = (15, 22, 4, 1)$
142 : $P_{5891} = (2, 23, 4, 1)$
143 : $P_{5913} = (24, 23, 4, 1)$
144 : $P_{5915} = (26, 23, 4, 1)$
145 : $P_{5930} = (9, 24, 4, 1)$
146 : $P_{5971} = (18, 25, 4, 1)$
147 : $P_{6015} = (30, 26, 4, 1)$
148 : $P_{6037} = (20, 27, 4, 1)$
149 : $P_{6060} = (11, 28, 4, 1)$
150 : $P_{6123} = (10, 30, 4, 1)$
151 : $P_{6238} = (29, 1, 5, 1)$
152 : $P_{6282} = (9, 3, 5, 1)$
153 : $P_{6318} = (13, 4, 5, 1)$

$154: P_{6322} = (17, 4, 5, 1)$
$155: P_{6333} = (28, 4, 5, 1)$
$156: P_{6359} = (22, 5, 5, 1)$
$157: P_{6527} = (30, 10, 5, 1)$
$158: P_{6564} = (3, 12, 5, 1)$
$159: P_{6565} = (4, 12, 5, 1)$
$160: P_{6568} = (7, 12, 5, 1)$
$161: P_{6601} = (8, 13, 5, 1)$
$162: P_{6659} = (2, 15, 5, 1)$
$163: P_{6681} = (24, 15, 5, 1)$
$164: P_{6683} = (26, 15, 5, 1)$
$165: P_{6695} = (6, 16, 5, 1)$
$166: P_{6732} = (11, 17, 5, 1)$
$167: P_{6804} = (19, 19, 5, 1)$
$168: P_{6867} = (18, 21, 5, 1)$
$169: P_{6955} = (10, 24, 5, 1)$
$170: P_{6992} = (15, 25, 5, 1)$
$171: P_{7021} = (12, 26, 5, 1)$
$172: P_{7032} = (23, 26, 5, 1)$
$173: P_{7036} = (27, 26, 5, 1)$
$174: P_{7055} = (14, 27, 5, 1)$
$175: P_{7093} = (20, 28, 5, 1)$
$176: P_{7110} = (5, 29, 5, 1)$
$177: P_{7121} = (16, 29, 5, 1)$
$178: P_{7126} = (21, 29, 5, 1)$
$179: P_{7168} = (31, 30, 5, 1)$
$180: P_{7194} = (25, 31, 5, 1)$
$181: P_{7238} = (5, 1, 6, 1)$
$182: P_{7249} = (16, 1, 6, 1)$
$183: P_{7254} = (21, 1, 6, 1)$
$184: P_{7290} = (25, 2, 6, 1)$
$185: P_{7343} = (14, 4, 6, 1)$
$186: P_{7406} = (13, 6, 6, 1)$
$187: P_{7410} = (17, 6, 6, 1)$
$188: P_{7421} = (28, 6, 6, 1)$
$189: P_{7440} = (15, 7, 6, 1)$
$190: P_{7476} = (19, 8, 6, 1)$
$191: P_{7524} = (3, 10, 6, 1)$
$192: P_{7525} = (4, 10, 6, 1)$
$193: P_{7528} = (7, 10, 6, 1)$
$194: P_{7564} = (11, 11, 6, 1)$
$195: P_{7635} = (18, 13, 6, 1)$
$196: P_{7711} = (30, 15, 6, 1)$
$197: P_{7722} = (9, 16, 6, 1)$
$198: P_{7776} = (31, 17, 6, 1)$
$199: P_{7797} = (20, 18, 6, 1)$
$200: P_{7838} = (29, 19, 6, 1)$
$201: P_{7851} = (10, 20, 6, 1)$
$202: P_{7895} = (22, 21, 6, 1)$
$203: P_{7949} = (12, 23, 6, 1)$
$204: P_{7960} = (23, 23, 6, 1)$
$205: P_{7964} = (27, 23, 6, 1)$
$206: P_{7975} = (6, 24, 6, 1)$
$207: P_{8009} = (8, 25, 6, 1)$
$208: P_{8035} = (2, 26, 6, 1)$
$209: P_{8057} = (24, 26, 6, 1)$
$210: P_{8059} = (26, 26, 6, 1)$
$211: P_{8287} = (30, 1, 7, 1)$
$212: P_{8352} = (31, 3, 7, 1)$
$213: P_{8361} = (8, 4, 7, 1)$
$214: P_{8432} = (15, 6, 7, 1)$
$215: P_{8468} = (19, 7, 7, 1)$
$216: P_{8493} = (12, 8, 7, 1)$
$217: P_{8504} = (23, 8, 7, 1)$
$218: P_{8508} = (27, 8, 7, 1)$
$219: P_{8519} = (6, 9, 7, 1)$
$220: P_{8590} = (13, 11, 7, 1)$
$221: P_{8594} = (17, 11, 7, 1)$
$222: P_{8605} = (28, 11, 7, 1)$
$223: P_{8646} = (5, 13, 7, 1)$
$224: P_{8657} = (16, 13, 7, 1)$
$225: P_{8662} = (21, 13, 7, 1)$
$226: P_{8682} = (9, 14, 7, 1)$
$227: P_{8748} = (11, 16, 7, 1)$
$228: P_{8783} = (14, 17, 7, 1)$
$229: P_{8823} = (22, 18, 7, 1)$
$230: P_{8835} = (2, 19, 7, 1)$
$231: P_{8857} = (24, 19, 7, 1)$
$232: P_{8859} = (26, 19, 7, 1)$
$233: P_{8885} = (20, 20, 7, 1)$
$234: P_{9054} = (29, 25, 7, 1)$
$235: P_{9082} = (25, 26, 7, 1)$
$236: P_{9107} = (18, 27, 7, 1)$
$237: P_{9156} = (3, 29, 7, 1)$
$238: P_{9157} = (4, 29, 7, 1)$
$239: P_{9160} = (7, 29, 7, 1)$
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646 : $P_{23053} = (12, 15, 21, 1)$
647 : $P_{23064} = (23, 15, 21, 1)$
648 : $P_{23068} = (27, 15, 21, 1)$
649 : $P_{23083} = (10, 16, 21, 1)$
650 : $P_{23151} = (14, 18, 21, 1)$
651 : $P_{23232} = (31, 20, 21, 1)$
652 : $P_{23241} = (8, 21, 21, 1)$
653 : $P_{23270} = (5, 22, 21, 1)$
654 : $P_{23281} = (16, 22, 21, 1)$
655 : $P_{23286} = (21, 22, 21, 1)$
656 : $P_{23438} = (13, 27, 21, 1)$
657 : $P_{23442} = (17, 27, 21, 1)$
658 : $P_{23453} = (28, 27, 21, 1)$
659 : $P_{23518} = (29, 29, 21, 1)$
660 : $P_{23532} = (11, 30, 21, 1)$
661 : $P_{23619} = (2, 1, 22, 1)$
662 : $P_{23641} = (24, 1, 22, 1)$
663 : $P_{23643} = (26, 1, 22, 1)$
664 : $P_{23680} = (31, 2, 22, 1)$
665 : $P_{23692} = (11, 3, 22, 1)$
666 : $P_{23728} = (15, 4, 22, 1)$
667 : $P_{23883} = (10, 9, 22, 1)$
668 : $P_{24030} = (29, 13, 22, 1)$
669 : $P_{24039} = (6, 14, 22, 1)$
670 : $P_{24090} = (25, 15, 22, 1)$
671 : $P_{24142} = (13, 17, 22, 1)$
672 : $P_{24146} = (17, 17, 22, 1)$
673 : $P_{24157} = (28, 17, 22, 1)$
674 : $P_{24179} = (18, 18, 22, 1)$
675 : $P_{24205} = (12, 19, 22, 1)$
676 : $P_{24216} = (23, 19, 22, 1)$
677 : $P_{24220} = (27, 19, 22, 1)$
678 : $P_{24262} = (5, 21, 22, 1)$
679 : $P_{24273} = (16, 21, 22, 1)$
680 : $P_{24278} = (21, 21, 22, 1)$
681 : $P_{24292} = (3, 22, 22, 1)$
682 : $P_{24293} = (4, 22, 22, 1)$
683 : $P_{24296} = (7, 22, 22, 1)$
684 : $P_{24330} = (9, 23, 22, 1)$
685 : $P_{24373} = (20, 24, 22, 1)$
686 : $P_{24404} = (19, 25, 22, 1)$
687 : $P_{24457} = (8, 27, 22, 1)$
688 : $P_{24503} = (22, 28, 22, 1)$
689 : $P_{24543} = (30, 29, 22, 1)$
690 : $P_{24559} = (14, 30, 22, 1)$
691 : $P_{24651} = (10, 1, 23, 1)$
692 : $P_{24691} = (18, 2, 23, 1)$
693 : $P_{24713} = (8, 3, 23, 1)$

694 : $P_{24739} = (2, 4, 23, 1)$
695 : $P_{24761} = (24, 4, 23, 1)$
696 : $P_{24763} = (26, 4, 23, 1)$
697 : $P_{24813} = (12, 6, 23, 1)$
698 : $P_{24824} = (23, 6, 23, 1)$
699 : $P_{24828} = (27, 6, 23, 1)$
700 : $P_{24896} = (31, 8, 23, 1)$
701 : $P_{24980} = (19, 11, 23, 1)$
702 : $P_{25004} = (11, 12, 23, 1)$
703 : $P_{25070} = (13, 14, 23, 1)$
704 : $P_{25074} = (17, 14, 23, 1)$
705 : $P_{25085} = (28, 14, 23, 1)$
706 : $P_{25109} = (20, 15, 23, 1)$
707 : $P_{25136} = (15, 16, 23, 1)$
708 : $P_{25182} = (29, 17, 23, 1)$
709 : $P_{25188} = (3, 18, 23, 1)$
710 : $P_{25189} = (4, 18, 23, 1)$
711 : $P_{25192} = (7, 18, 23, 1)$
712 : $P_{25322} = (9, 22, 23, 1)$
713 : $P_{25359} = (14, 23, 23, 1)$
714 : $P_{25434} = (25, 25, 23, 1)$
715 : $P_{25503} = (30, 27, 23, 1)$
716 : $P_{25543} = (6, 29, 23, 1)$
717 : $P_{25574} = (5, 30, 23, 1)$
718 : $P_{25585} = (16, 30, 23, 1)$
719 : $P_{25590} = (21, 30, 23, 1)$
720 : $P_{25623} = (22, 31, 23, 1)$
721 : $P_{25679} = (14, 1, 24, 1)$
722 : $P_{25716} = (19, 2, 24, 1)$
723 : $P_{25770} = (9, 4, 24, 1)$
724 : $P_{25803} = (10, 5, 24, 1)$
725 : $P_{25831} = (6, 6, 24, 1)$
726 : $P_{25926} = (5, 9, 24, 1)$
727 : $P_{25937} = (16, 9, 24, 1)$
728 : $P_{25942} = (21, 9, 24, 1)$
729 : $P_{25971} = (18, 10, 24, 1)$
730 : $P_{26039} = (22, 12, 24, 1)$
731 : $P_{26080} = (31, 13, 24, 1)$
732 : $P_{26121} = (8, 15, 24, 1)$
733 : $P_{26148} = (3, 16, 24, 1)$
734 : $P_{26149} = (4, 16, 24, 1)$
735 : $P_{26152} = (7, 16, 24, 1)$
736 : $P_{26234} = (25, 18, 24, 1)$
737 : $P_{26254} = (13, 19, 24, 1)$
738 : $P_{26258} = (17, 19, 24, 1)$
739 : $P_{26269} = (28, 19, 24, 1)$
740 : $P_{26275} = (2, 20, 24, 1)$
741 : $P_{26297} = (24, 20, 24, 1)$
742 : $P_{26299} = (26, 20, 24, 1)$
743 : $P_{26357} = (20, 22, 24, 1)$
744 : $P_{26431} = (30, 24, 24, 1)$
745 : $P_{26444} = (11, 25, 24, 1)$
746 : $P_{26480} = (15, 26, 24, 1)$
747 : $P_{26605} = (12, 30, 24, 1)$
748 : $P_{26616} = (23, 30, 24, 1)$
749 : $P_{26620} = (27, 30, 24, 1)$
750 : $P_{26654} = (29, 31, 24, 1)$
751 : $P_{26692} = (3, 1, 25, 1)$
752 : $P_{26693} = (4, 1, 25, 1)$
753 : $P_{26696} = (7, 1, 25, 1)$
754 : $P_{26731} = (10, 2, 25, 1)$
755 : $P_{26803} = (18, 4, 25, 1)$
756 : $P_{26832} = (15, 5, 25, 1)$
757 : $P_{26857} = (8, 6, 25, 1)$
758 : $P_{26910} = (29, 7, 25, 1)$
759 : $P_{26915} = (2, 8, 25, 1)$
760 : $P_{26937} = (24, 8, 25, 1)$
761 : $P_{26939} = (26, 8, 25, 1)$
762 : $P_{26954} = (9, 9, 25, 1)$
763 : $P_{27023} = (14, 11, 25, 1)$
764 : $P_{27053} = (12, 12, 25, 1)$
765 : $P_{27064} = (23, 12, 25, 1)$
766 : $P_{27068} = (27, 12, 25, 1)$
767 : $P_{27200} = (31, 16, 25, 1)$
768 : $P_{27295} = (30, 19, 25, 1)$
769 : $P_{27380} = (19, 22, 25, 1)$
770 : $P_{27418} = (25, 23, 25, 1)$
771 : $P_{27436} = (11, 24, 25, 1)$
772 : $P_{27462} = (5, 25, 25, 1)$
773 : $P_{27473} = (16, 25, 25, 1)$
774 : $P_{27478} = (21, 25, 25, 1)$
775 : $P_{27543} = (22, 27, 25, 1)$
776 : $P_{27566} = (13, 28, 25, 1)$
777 : $P_{27570} = (17, 28, 25, 1)$
778 : $P_{27581} = (28, 28, 25, 1)$
779 : $P_{27637} = (20, 30, 25, 1)$
780 : $P_{27655} = (6, 31, 25, 1)$
781 : $P_{27719} = (6, 1, 26, 1)$
782 : $P_{27767} = (22, 2, 26, 1)$
783 : $P_{27795} = (18, 3, 26, 1)$
784 : $P_{27839} = (30, 4, 26, 1)$
785 : $P_{27853} = (12, 5, 26, 1)$
786 : $P_{27864} = (23, 5, 26, 1)$
787 : $P_{27868} = (27, 5, 26, 1)$
788 : $P_{27875} = (2, 6, 26, 1)$
789 : $P_{27897} = (24, 6, 26, 1)$
790 : $P_{27899} = (26, 6, 26, 1)$
791 : $P_{27930} = (25, 7, 26, 1)$
792 : $P_{27982} = (13, 9, 26, 1)$
793 : $P_{27986} = (17, 9, 26, 1)$
794 : $P_{27997} = (28, 9, 26, 1)$
795 : $P_{28012} = (11, 10, 26, 1)$
796 : $P_{28062} = (29, 11, 26, 1)$
797 : $P_{28096} = (31, 12, 26, 1)$
798 : $P_{28143} = (14, 14, 26, 1)$
799 : $P_{28201} = (8, 16, 26, 1)$
800 : $P_{28230} = (5, 17, 26, 1)$
801 : $P_{28241} = (16, 17, 26, 1)$

802 : $P_{28246} = (21, 17, 26, 1)$
803 : $P_{28299} = (10, 19, 26, 1)$
804 : $P_{28464} = (15, 24, 26, 1)$
805 : $P_{28533} = (20, 26, 26, 1)$
806 : $P_{28548} = (3, 27, 26, 1)$
807 : $P_{28549} = (4, 27, 26, 1)$
808 : $P_{28552} = (7, 27, 26, 1)$
809 : $P_{28596} = (19, 28, 26, 1)$
810 : $P_{28618} = (9, 29, 26, 1)$
811 : $P_{28853} = (20, 4, 27, 1)$
812 : $P_{28879} = (14, 5, 27, 1)$
813 : $P_{28947} = (18, 7, 27, 1)$
814 : $P_{28966} = (5, 8, 27, 1)$
815 : $P_{28977} = (16, 8, 27, 1)$
816 : $P_{28982} = (21, 8, 27, 1)$
817 : $P_{29005} = (12, 9, 27, 1)$
818 : $P_{29016} = (23, 9, 27, 1)$
819 : $P_{29020} = (27, 9, 27, 1)$
820 : $P_{29044} = (19, 10, 27, 1)$
821 : $P_{29118} = (29, 12, 27, 1)$
822 : $P_{29155} = (2, 14, 27, 1)$
823 : $P_{29177} = (24, 14, 27, 1)$
824 : $P_{29179} = (26, 14, 27, 1)$
825 : $P_{29242} = (25, 16, 27, 1)$
826 : $P_{29259} = (10, 17, 27, 1)$
827 : $P_{29292} = (11, 18, 27, 1)$
828 : $P_{29354} = (9, 20, 27, 1)$
829 : $P_{29390} = (13, 21, 27, 1)$
830 : $P_{29394} = (17, 21, 27, 1)$
831 : $P_{29405} = (28, 21, 27, 1)$
832 : $P_{29417} = (8, 22, 27, 1)$
833 : $P_{29471} = (30, 23, 27, 1)$
834 : $P_{29527} = (22, 25, 27, 1)$
835 : $P_{29540} = (3, 26, 27, 1)$
836 : $P_{29541} = (4, 26, 27, 1)$
837 : $P_{29544} = (7, 26, 27, 1)$
838 : $P_{29632} = (31, 28, 27, 1)$
839 : $P_{29648} = (15, 29, 27, 1)$
840 : $P_{29671} = (6, 30, 27, 1)$
841 : $P_{29769} = (8, 1, 28, 1)$
842 : $P_{29805} = (12, 2, 28, 1)$
843 : $P_{29816} = (23, 2, 28, 1)$
844 : $P_{29820} = (27, 2, 28, 1)$
845 : $P_{29868} = (11, 4, 28, 1)$
846 : $P_{29909} = (20, 5, 28, 1)$
847 : $P_{30047} = (30, 9, 28, 1)$
848 : $P_{30054} = (5, 10, 28, 1)$
849 : $P_{30065} = (16, 10, 28, 1)$
850 : $P_{30070} = (21, 10, 28, 1)$
851 : $P_{30087} = (6, 11, 28, 1)$
852 : $P_{30159} = (14, 13, 28, 1)$
853 : $P_{30180} = (3, 14, 28, 1)$
854 : $P_{30181} = (4, 14, 28, 1)$
855 : $P_{30184} = (7, 14, 28, 1)$
856 : $P_{30238} = (29, 15, 28, 1)$
857 : $P_{30282} = (9, 17, 28, 1)$
858 : $P_{30352} = (15, 19, 28, 1)$
859 : $P_{30394} = (25, 20, 28, 1)$
860 : $P_{30455} = (22, 22, 28, 1)$
861 : $P_{30542} = (13, 25, 28, 1)$
862 : $P_{30546} = (17, 25, 28, 1)$
863 : $P_{30557} = (28, 25, 28, 1)$
864 : $P_{30580} = (19, 26, 28, 1)$
865 : $P_{30624} = (31, 27, 28, 1)$
866 : $P_{30635} = (10, 28, 28, 1)$
867 : $P_{30675} = (18, 29, 28, 1)$
868 : $P_{30723} = (2, 31, 28, 1)$
869 : $P_{30745} = (24, 31, 28, 1)$
870 : $P_{30747} = (26, 31, 28, 1)$
871 : $P_{30797} = (12, 1, 29, 1)$
872 : $P_{30808} = (23, 1, 29, 1)$
873 : $P_{30812} = (27, 1, 29, 1)$
874 : $P_{30828} = (11, 2, 29, 1)$
875 : $P_{30918} = (5, 5, 29, 1)$
876 : $P_{30929} = (16, 5, 29, 1)$
877 : $P_{30934} = (21, 5, 29, 1)$
878 : $P_{30980} = (3, 7, 29, 1)$
879 : $P_{30981} = (4, 7, 29, 1)$
880 : $P_{30984} = (7, 7, 29, 1)$
881 : $P_{31098} = (25, 10, 29, 1)$
882 : $P_{31127} = (22, 11, 29, 1)$
883 : $P_{31188} = (19, 13, 29, 1)$
884 : $P_{31211} = (10, 14, 29, 1)$
885 : $P_{31285} = (20, 16, 29, 1)$
886 : $P_{31337} = (8, 18, 29, 1)$
887 : $P_{31407} = (14, 20, 29, 1)$
888 : $P_{31454} = (29, 21, 29, 1)$
889 : $P_{31487} = (30, 22, 29, 1)$
890 : $P_{31495} = (6, 23, 29, 1)$
891 : $P_{31594} = (9, 26, 29, 1)$
892 : $P_{31632} = (15, 27, 29, 1)$
893 : $P_{31667} = (18, 28, 29, 1)$
894 : $P_{31683} = (2, 29, 29, 1)$
895 : $P_{31705} = (24, 29, 29, 1)$
896 : $P_{31707} = (26, 29, 29, 1)$
897 : $P_{31726} = (13, 30, 29, 1)$
898 : $P_{31730} = (17, 30, 29, 1)$
899 : $P_{31741} = (28, 30, 29, 1)$
900 : $P_{31776} = (31, 31, 29, 1)$
901 : $P_{31844} = (3, 2, 30, 1)$
902 : $P_{31845} = (4, 2, 30, 1)$
903 : $P_{31848} = (7, 2, 30, 1)$
904 : $P_{31903} = (30, 3, 30, 1)$
905 : $P_{31915} = (10, 4, 30, 1)$
906 : $P_{31968} = (31, 5, 30, 1)$
907 : $P_{32051} = (18, 8, 30, 1)$
908 : $P_{32084} = (19, 9, 30, 1)$
909 : $P_{32112} = (15, 10, 30, 1)$

910 : $P_{32154} = (25, 11, 30, 1)$
911 : $P_{32169} = (8, 12, 30, 1)$
912 : $P_{32254} = (29, 14, 30, 1)$
913 : $P_{32291} = (2, 16, 30, 1)$
914 : $P_{32313} = (24, 16, 30, 1)$
915 : $P_{32315} = (26, 16, 30, 1)$
916 : $P_{32362} = (9, 18, 30, 1)$
917 : $P_{32407} = (22, 19, 30, 1)$
918 : $P_{32460} = (11, 21, 30, 1)$
919 : $P_{32495} = (14, 22, 30, 1)$
920 : $P_{32518} = (5, 23, 30, 1)$
921 : $P_{32529} = (16, 23, 30, 1)$
922 : $P_{32534} = (21, 23, 30, 1)$
923 : $P_{32557} = (12, 24, 30, 1)$
924 : $P_{32568} = (23, 24, 30, 1)$
925 : $P_{32572} = (27, 24, 30, 1)$
926 : $P_{32597} = (20, 25, 30, 1)$
927 : $P_{32647} = (6, 27, 30, 1)$
928 : $P_{32718} = (13, 29, 30, 1)$
929 : $P_{32722} = (17, 29, 30, 1)$
930 : $P_{32733} = (28, 29, 30, 1)$
931 : $P_{32844} = (11, 1, 31, 1)$
932 : $P_{32986} = (25, 5, 31, 1)$
933 : $P_{33035} = (10, 7, 31, 1)$
934 : $P_{33077} = (20, 8, 31, 1)$
935 : $P_{33097} = (8, 9, 31, 1)$
936 : $P_{33135} = (14, 10, 31, 1)$
937 : $P_{33183} = (30, 11, 31, 1)$
938 : $P_{33226} = (9, 13, 31, 1)$
939 : $P_{33267} = (18, 14, 31, 1)$
940 : $P_{33294} = (13, 15, 31, 1)$
941 : $P_{33298} = (17, 15, 31, 1)$
942 : $P_{33309} = (28, 15, 31, 1)$
943 : $P_{33318} = (5, 16, 31, 1)$
944 : $P_{33329} = (16, 16, 31, 1)$
945 : $P_{33334} = (21, 16, 31, 1)$
946 : $P_{33348} = (3, 17, 31, 1)$
947 : $P_{33349} = (4, 17, 31, 1)$
948 : $P_{33352} = (7, 17, 31, 1)$
949 : $P_{33389} = (12, 18, 31, 1)$
950 : $P_{33400} = (23, 18, 31, 1)$
951 : $P_{33404} = (27, 18, 31, 1)$
952 : $P_{33460} = (19, 20, 31, 1)$
953 : $P_{33559} = (22, 23, 31, 1)$
954 : $P_{33598} = (29, 24, 31, 1)$
955 : $P_{33607} = (6, 25, 31, 1)$
956 : $P_{33699} = (2, 28, 31, 1)$
957 : $P_{33721} = (24, 28, 31, 1)$
958 : $P_{33723} = (26, 28, 31, 1)$
959 : $P_{33760} = (31, 29, 31, 1)$
960 : $P_{33808} = (15, 31, 31, 1)$

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	ℓ_1	ℓ_2
in point	P_1	P_2

Line 1 intersects

Line	ℓ_0	ℓ_2
in point	P_1	P_{1059}

Line 2 intersects

Line	ℓ_0	ℓ_1
in point	P_2	P_{1059}

The surface has 1057 points:
Too many to print.