Rank-355 over GF(32)

January 15, 2021

The equation

The equation of the surface is :

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

(0, 0, 0, 1, 1, 0, 1, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0)
The point rank of the equation over GF(32) is -2111765459

General information

Number of lines	3
Number of points	1089
Number of singular points	1
Number of Eckardt points	0
Number of double points	2
Number of single points	95
Number of points off lines	992
Number of Hesse planes	0
Number of axes	0
Type of points on lines	33^3
Type of lines on points	2^2, 1^{95}, 0^{992}

Singular Points

The surface has 1 singular points:

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

The 3 Lines

The lines and their Pluecker coordinates are:

$$\ell_0 = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 \end{bmatrix}_{1024} = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 \end{bmatrix}_{1024} = \mathbf{Pl}(0,0,1,0,0,0)_2$$

$$\ell_1 = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 1 & 1 \end{bmatrix}_{33} = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 1 & 1 \end{bmatrix}_{33} = \mathbf{Pl}(1,0,1,0,1,0)_{1153}$$

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

Rank of lines: (1024, 33, 34848)
Rank of points on Klein quadric: (2, 1153, 34)

Eckardt Points

The surface has 0 Eckardt points:

Double Points

The surface has 2 Double points:
The double points on the surface are:

$P_0 = (1,0,0,0) = \ell_0 \cap \ell_1$
$P_2 = (0,0,1,0) = \ell_0 \cap \ell_2$

Single Points

The surface has 95 single points:
The single points on the surface are:

0 : $P_4 = (1,1,1,1)$ lies on line ℓ_1
1 : $P_{36} = (1,0,1,0)$ lies on line ℓ_0
2 : $P_{37} = (2,0,1,0)$ lies on line ℓ_0
3 : $P_{38} = (3,0,1,0)$ lies on line ℓ_0
4 : $P_{39} = (4,0,1,0)$ lies on line ℓ_0
5 : $P_{40} = (5,0,1,0)$ lies on line ℓ_0
6 : $P_{41} = (6,0,1,0)$ lies on line ℓ_0
7 : $P_{42} = (7,0,1,0)$ lies on line ℓ_0
8 : $P_{43} = (8,0,1,0)$ lies on line ℓ_0
9 : $P_{44} = (9,0,1,0)$ lies on line ℓ_0
10 : $P_{45} = (10,0,1,0)$ lies on line ℓ_0
11 : $P_{46} = (11,0,1,0)$ lies on line ℓ_0
12 : $P_{47} = (12,0,1,0)$ lies on line ℓ_0
13 : $P_{48} = (13,0,1,0)$ lies on line ℓ_0
14 : $P_{49} = (14,0,1,0)$ lies on line ℓ_0
15 : $P_{50} = (15,0,1,0)$ lies on line ℓ_0
16 : $P_{51} = (16,0,1,0)$ lies on line ℓ_0
17 : $P_{52} = (17,0,1,0)$ lies on line ℓ_0
18 : $P_{53} = (18,0,1,0)$ lies on line ℓ_0
19 : $P_{54} = (19,0,1,0)$ lies on line ℓ_0
20 : $P_{55} = (20,0,1,0)$ lies on line ℓ_0
21 : $P_{56} = (21,0,1,0)$ lies on line ℓ_0
22 : $P_{57} = (22,0,1,0)$ lies on line ℓ_0
23 : $P_{58} = (23,0,1,0)$ lies on line ℓ_0
24 : $P_{59} = (24,0,1,0)$ lies on line ℓ_0
25 : $P_{60} = (25,0,1,0)$ lies on line ℓ_0
26 : $P_{61} = (26,0,1,0)$ lies on line ℓ_0
27 : $P_{62} = (27,0,1,0)$ lies on line ℓ_0
28 : $P_{63} = (28,0,1,0)$ lies on line ℓ_0
29 : $P_{64} = (29,0,1,0)$ lies on line ℓ_0
30 : $P_{65} = (30,0,1,0)$ lies on line ℓ_0
31 : $P_{66} = (31,0,1,0)$ lies on line ℓ_0
32 : $P_{1059} = (1,0,0,1)$ lies on line ℓ_2
33 : $P_{2083} = (1,0,1,1)$ lies on line ℓ_2
34 : $P_{2114} = (0,1,1,1)$ lies on line ℓ_1
35 : $P_{2115} = (2,1,1,1)$ lies on line ℓ_1
36 : $P_{2116} = (3,1,1,1)$ lies on line ℓ_1
37 : $P_{2117} = (4,1,1,1)$ lies on line ℓ_1
38 : $P_{2118} = (5,1,1,1)$ lies on line ℓ_1
39 : $P_{2119} = (6,1,1,1)$ lies on line ℓ_1
40 : $P_{2120} = (7,1,1,1)$ lies on line ℓ_1
41 : $P_{2121} = (8,1,1,1)$ lies on line ℓ_1
42 : $P_{2122} = (9,1,1,1)$ lies on line ℓ_1
43 : $P_{2123} = (10,1,1,1)$ lies on line ℓ_1
44 : $P_{2124} = (11,1,1,1)$ lies on line ℓ_1
45 : $P_{2125} = (12,1,1,1)$ lies on line ℓ_1
46 : $P_{2126} = (13,1,1,1)$ lies on line ℓ_1
47 : $P_{2127} = (14,1,1,1)$ lies on line ℓ_1
48 : $P_{2128} = (15,1,1,1)$ lies on line ℓ_1
49 : $P_{2129} = (16,1,1,1)$ lies on line ℓ_1
50 : $P_{2130} = (17,1,1,1)$ lies on line ℓ_1
51 : $P_{2131} = (18,1,1,1)$ lies on line ℓ_1

52 : $P_{2132} = (19, 1, 1, 1)$ lies on line ℓ_1
53 : $P_{2133} = (20, 1, 1, 1)$ lies on line ℓ_1
54 : $P_{2134} = (21, 1, 1, 1)$ lies on line ℓ_1
55 : $P_{2135} = (22, 1, 1, 1)$ lies on line ℓ_1
56 : $P_{2136} = (23, 1, 1, 1)$ lies on line ℓ_1
57 : $P_{2137} = (24, 1, 1, 1)$ lies on line ℓ_1
58 : $P_{2138} = (25, 1, 1, 1)$ lies on line ℓ_1
59 : $P_{2139} = (26, 1, 1, 1)$ lies on line ℓ_1
60 : $P_{2140} = (27, 1, 1, 1)$ lies on line ℓ_1
61 : $P_{2141} = (28, 1, 1, 1)$ lies on line ℓ_1
62 : $P_{2142} = (29, 1, 1, 1)$ lies on line ℓ_1
63 : $P_{2143} = (30, 1, 1, 1)$ lies on line ℓ_1
64 : $P_{2144} = (31, 1, 1, 1)$ lies on line ℓ_1
65 : $P_{3106} = (1, 0, 2, 1)$ lies on line ℓ_2
66 : $P_{4130} = (1, 0, 3, 1)$ lies on line ℓ_2
67 : $P_{5154} = (1, 0, 4, 1)$ lies on line ℓ_2
68 : $P_{6178} = (1, 0, 5, 1)$ lies on line ℓ_2
69 : $P_{7202} = (1, 0, 6, 1)$ lies on line ℓ_2
70 : $P_{8226} = (1, 0, 7, 1)$ lies on line ℓ_2
71 : $P_{9250} = (1, 0, 8, 1)$ lies on line ℓ_2
72 : $P_{10274} = (1, 0, 9, 1)$ lies on line ℓ_2
73 : $P_{11298} = (1, 0, 10, 1)$ lies on line ℓ_2
74 : $P_{12322} = (1, 0, 11, 1)$ lies on line ℓ_2
75 : $P_{13346} = (1, 0, 12, 1)$ lies on line ℓ_2
76 : $P_{14370} = (1, 0, 13, 1)$ lies on line ℓ_2
77 : $P_{15394} = (1, 0, 14, 1)$ lies on line ℓ_2
78 : $P_{16418} = (1, 0, 15, 1)$ lies on line ℓ_2
79 : $P_{17442} = (1, 0, 16, 1)$ lies on line ℓ_2
80 : $P_{18466} = (1, 0, 17, 1)$ lies on line ℓ_2
81 : $P_{19490} = (1, 0, 18, 1)$ lies on line ℓ_2
82 : $P_{20514} = (1, 0, 19, 1)$ lies on line ℓ_2
83 : $P_{21538} = (1, 0, 20, 1)$ lies on line ℓ_2
84 : $P_{22562} = (1, 0, 21, 1)$ lies on line ℓ_2
85 : $P_{23586} = (1, 0, 22, 1)$ lies on line ℓ_2
86 : $P_{24610} = (1, 0, 23, 1)$ lies on line ℓ_2
87 : $P_{25634} = (1, 0, 24, 1)$ lies on line ℓ_2
88 : $P_{26658} = (1, 0, 25, 1)$ lies on line ℓ_2
89 : $P_{27682} = (1, 0, 26, 1)$ lies on line ℓ_2
90 : $P_{28706} = (1, 0, 27, 1)$ lies on line ℓ_2
91 : $P_{29730} = (1, 0, 28, 1)$ lies on line ℓ_2
92 : $P_{30754} = (1, 0, 29, 1)$ lies on line ℓ_2
93 : $P_{31778} = (1, 0, 30, 1)$ lies on line ℓ_2
94 : $P_{32802} = (1, 0, 31, 1)$ lies on line ℓ_2

The single points on the surface are:

Points on surface but on no line

The surface has 992 points not on any line:
The points on the surface but not on lines are:

0 : $P_1 = (0, 1, 0, 0)$
1 : $P_{68} = (1, 1, 1, 0)$
2 : $P_{126} = (27, 2, 1, 0)$
3 : $P_{157} = (26, 3, 1, 0)$
4 : $P_{165} = (2, 4, 1, 0)$
5 : $P_{198} = (3, 5, 1, 0)$
6 : $P_{252} = (25, 6, 1, 0)$
7 : $P_{283} = (24, 7, 1, 0)$
8 : $P_{310} = (19, 8, 1, 0)$
9 : $P_{341} = (18, 9, 1, 0)$
10 : $P_{363} = (8, 10, 1, 0)$
11 : $P_{396} = (9, 11, 1, 0)$
12 : $P_{436} = (17, 12, 1, 0)$
13 : $P_{467} = (16, 13, 1, 0)$
14 : $P_{493} = (10, 14, 1, 0)$
15 : $P_{526} = (11, 15, 1, 0)$
16 : $P_{551} = (4, 16, 1, 0)$
17 : $P_{584} = (5, 17, 1, 0)$
18 : $P_{642} = (31, 18, 1, 0)$
19 : $P_{673} = (30, 19, 1, 0)$
20 : $P_{681} = (6, 20, 1, 0)$
21 : $P_{714} = (7, 21, 1, 0)$
22 : $P_{768} = (29, 22, 1, 0)$
23 : $P_{799} = (28, 23, 1, 0)$
24 : $P_{826} = (23, 24, 1, 0)$
25 : $P_{857} = (22, 25, 1, 0)$
26 : $P_{879} = (12, 26, 1, 0)$
27 : $P_{912} = (13, 27, 1, 0)$
28 : $P_{952} = (21, 28, 1, 0)$
29 : $P_{983} = (20, 29, 1, 0)$
30 : $P_{1009} = (14, 30, 1, 0)$
31 : $P_{1042} = (15, 31, 1, 0)$
32 : $P_{1143} = (21, 2, 0, 1)$
33 : $P_{1185} = (31, 3, 0, 1)$
34 : $P_{1214} = (28, 4, 0, 1)$
35 : $P_{1236} = (18, 5, 0, 1)$
36 : $P_{1267} = (17, 6, 0, 1)$
37 : $P_{1292} = (10, 7, 0, 1)$
38 : $P_{1316} = (2, 8, 0, 1)$
39 : $P_{1375} = (29, 9, 0, 1)$
40 : $P_{1382} = (4, 10, 0, 1)$
41 : $P_{1432} = (22, 11, 0, 1)$
42 : $P_{1453} = (11, 12, 0, 1)$
43 : $P_{1498} = (24, 13, 0, 1)$

$44: P_{1522} = (16, 14, 0, 1)$
$45: P_{1563} = (25, 15, 0, 1)$
$46: P_{1593} = (23, 16, 0, 1)$
$47: P_{1611} = (9, 17, 0, 1)$
$48: P_{1654} = (20, 18, 0, 1)$
$49: P_{1693} = (27, 19, 0, 1)$
$50: P_{1710} = (12, 20, 0, 1)$
$51: P_{1744} = (14, 21, 0, 1)$
$52: P_{1765} = (3, 22, 0, 1)$
$53: P_{1813} = (19, 23, 0, 1)$
$54: P_{1834} = (8, 24, 0, 1)$
$55: P_{1863} = (5, 25, 0, 1)$
$56: P_{1905} = (15, 26, 0, 1)$
$57: P_{1929} = (7, 27, 0, 1)$
$58: P_{1984} = (30, 28, 0, 1)$
$59: P_{2012} = (26, 29, 0, 1)$
$60: P_{2031} = (13, 30, 0, 1)$
$61: P_{2056} = (6, 31, 0, 1)$
$62: P_{2171} = (26, 2, 1, 1)$
$63: P_{2204} = (27, 3, 1, 1)$
$64: P_{2212} = (3, 4, 1, 1)$
$65: P_{2243} = (2, 5, 1, 1)$
$66: P_{2297} = (24, 6, 1, 1)$
$67: P_{2330} = (25, 7, 1, 1)$
$68: P_{2355} = (18, 8, 1, 1)$
$69: P_{2388} = (19, 9, 1, 1)$
$70: P_{2410} = (9, 10, 1, 1)$
$71: P_{2441} = (8, 11, 1, 1)$
$72: P_{2481} = (16, 12, 1, 1)$
$73: P_{2514} = (17, 13, 1, 1)$
$74: P_{2540} = (11, 14, 1, 1)$
$75: P_{2571} = (10, 15, 1, 1)$
$76: P_{2598} = (5, 16, 1, 1)$
$77: P_{2629} = (4, 17, 1, 1)$
$78: P_{2687} = (30, 18, 1, 1)$
$79: P_{2720} = (31, 19, 1, 1)$
$80: P_{2728} = (7, 20, 1, 1)$
$81: P_{2759} = (6, 21, 1, 1)$
$82: P_{2813} = (28, 22, 1, 1)$
$83: P_{2846} = (29, 23, 1, 1)$
$84: P_{2871} = (22, 24, 1, 1)$
$85: P_{2904} = (23, 25, 1, 1)$
$86: P_{2926} = (13, 26, 1, 1)$
$87: P_{2957} = (12, 27, 1, 1)$
$88: P_{2997} = (20, 28, 1, 1)$
$89: P_{3030} = (21, 29, 1, 1)$
$90: P_{3056} = (15, 30, 1, 1)$
$91: P_{3087} = (14, 31, 1, 1)$
$92: P_{3193} = (24, 2, 2, 1)$
$93: P_{3229} = (28, 3, 2, 1)$
$94: P_{3262} = (29, 4, 2, 1)$
$95: P_{3295} = (30, 5, 2, 1)$
$96: P_{3309} = (12, 6, 2, 1)$
$97: P_{3343} = (14, 7, 2, 1)$
$98: P_{3375} = (14, 8, 2, 1)$
$99: P_{3404} = (11, 9, 2, 1)$
$100: P_{3451} = (26, 10, 2, 1)$
$101: P_{3469} = (12, 11, 2, 1)$
$102: P_{3498} = (9, 12, 2, 1)$
$103: P_{3526} = (5, 13, 2, 1)$
$104: P_{3571} = (18, 14, 2, 1)$
$105: P_{3614} = (29, 15, 2, 1)$
$106: P_{3625} = (8, 16, 2, 1)$
$107: P_{3672} = (23, 17, 2, 1)$
$108: P_{3682} = (1, 18, 2, 1)$
$109: P_{3737} = (24, 19, 2, 1)$
$110: P_{3747} = (2, 20, 2, 1)$
$111: P_{3785} = (8, 21, 2, 1)$
$112: P_{3811} = (2, 22, 2, 1)$
$113: P_{3846} = (5, 23, 2, 1)$
$114: P_{3891} = (18, 24, 2, 1)$
$115: P_{3931} = (26, 25, 2, 1)$
$116: P_{3965} = (28, 26, 2, 1)$
$117: P_{3978} = (9, 27, 2, 1)$
$118: P_{4012} = (11, 28, 2, 1)$
$119: P_{4056} = (23, 29, 2, 1)$
$120: P_{4095} = (30, 30, 2, 1)$
$121: P_{4097} = (0, 31, 2, 1)$
$122: P_{4216} = (23, 2, 3, 1)$
$123: P_{4249} = (24, 3, 3, 1)$
$124: P_{4259} = (2, 4, 3, 1)$
$125: P_{4303} = (14, 5, 3, 1)$
$126: P_{4326} = (5, 6, 3, 1)$
$127: P_{4382} = (29, 7, 3, 1)$
$128: P_{4415} = (30, 8, 3, 1)$
$129: P_{4422} = (5, 9, 3, 1)$
$130: P_{4472} = (23, 10, 3, 1)$
$131: P_{4499} = (18, 11, 3, 1)$
$132: P_{4531} = (18, 12, 3, 1)$
$133: P_{4557} = (12, 13, 3, 1)$
$134: P_{4586} = (9, 14, 3, 1)$
$135: P_{4623} = (14, 15, 3, 1)$
$136: P_{4667} = (26, 16, 3, 1)$
$137: P_{4699} = (26, 17, 3, 1)$
$138: P_{4716} = (11, 18, 3, 1)$
$139: P_{4765} = (28, 19, 3, 1)$
$140: P_{4778} = (9, 20, 3, 1)$
$141: P_{4801} = (0, 21, 3, 1)$
$142: P_{4862} = (29, 22, 3, 1)$
$143: P_{4876} = (11, 23, 3, 1)$
$144: P_{4909} = (12, 24, 3, 1)$
$145: P_{4937} = (8, 25, 3, 1)$
$146: P_{4991} = (30, 26, 3, 1)$
$147: P_{4995} = (2, 27, 3, 1)$
$148: P_{5026} = (1, 28, 3, 1)$
$149: P_{5081} = (24, 29, 3, 1)$
$150: P_{5117} = (28, 30, 3, 1)$
$151: P_{5129} = (8, 31, 3, 1)$

$152: P_{5228} = (11, 2, 4, 1)$
$153: P_{5272} = (23, 3, 4, 1)$
$154: P_{5288} = (7, 4, 4, 1)$
$155: P_{5336} = (23, 5, 4, 1)$
$156: P_{5348} = (3, 6, 4, 1)$
$157: P_{5386} = (9, 7, 4, 1)$
$158: P_{5416} = (7, 8, 4, 1)$
$159: P_{5442} = (1, 9, 4, 1)$
$160: P_{5503} = (30, 10, 4, 1)$
$161: P_{5520} = (15, 11, 4, 1)$
$162: P_{5561} = (24, 12, 4, 1)$
$163: P_{5579} = (10, 13, 4, 1)$
$164: P_{5604} = (3, 14, 4, 1)$
$165: P_{5659} = (26, 15, 4, 1)$
$166: P_{5687} = (22, 16, 4, 1)$
$167: P_{5716} = (19, 17, 4, 1)$
$168: P_{5729} = (0, 18, 4, 1)$
$169: P_{5780} = (19, 19, 4, 1)$
$170: P_{5819} = (26, 20, 4, 1)$
$171: P_{5855} = (30, 21, 4, 1)$
$172: P_{5881} = (24, 22, 4, 1)$
$173: P_{5904} = (15, 23, 4, 1)$
$174: P_{5938} = (17, 24, 4, 1)$
$175: P_{5957} = (4, 25, 4, 1)$
$176: P_{5996} = (11, 26, 4, 1)$
$177: P_{6034} = (17, 27, 4, 1)$
$178: P_{6059} = (10, 28, 4, 1)$
$179: P_{6085} = (4, 29, 4, 1)$
$180: P_{6122} = (9, 30, 4, 1)$
$181: P_{6167} = (22, 31, 4, 1)$
$182: P_{6245} = (4, 2, 5, 1)$
$183: P_{6292} = (19, 3, 5, 1)$
$184: P_{6329} = (24, 4, 5, 1)$
$185: P_{6344} = (7, 5, 5, 1)$
$186: P_{6379} = (10, 6, 5, 1)$
$187: P_{6427} = (26, 7, 5, 1)$
$188: P_{6456} = (23, 8, 5, 1)$
$189: P_{6480} = (15, 9, 5, 1)$
$190: P_{6516} = (19, 10, 5, 1)$
$191: P_{6546} = (17, 11, 5, 1)$
$192: P_{6564} = (3, 12, 5, 1)$
$193: P_{6596} = (3, 13, 5, 1)$
$194: P_{6649} = (24, 14, 5, 1)$
$195: P_{6666} = (9, 15, 5, 1)$
$196: P_{6693} = (4, 16, 5, 1)$
$197: P_{6751} = (30, 17, 5, 1)$
$198: P_{6763} = (10, 18, 5, 1)$
$199: P_{6808} = (23, 19, 5, 1)$
$200: P_{6834} = (17, 20, 5, 1)$
$201: P_{6871} = (22, 21, 5, 1)$
$202: P_{6888} = (7, 22, 5, 1)$
$203: P_{6914} = (1, 23, 5, 1)$
$204: P_{6960} = (15, 24, 5, 1)$
$205: P_{6999} = (22, 25, 5, 1)$
$206: P_{7018} = (9, 26, 5, 1)$
$207: P_{7067} = (26, 27, 5, 1)$
$208: P_{7073} = (0, 28, 5, 1)$
$209: P_{7116} = (11, 29, 5, 1)$
$210: P_{7148} = (11, 30, 5, 1)$
$211: P_{7199} = (30, 31, 5, 1)$
$212: P_{7271} = (6, 2, 6, 1)$
$213: P_{7317} = (20, 3, 6, 1)$
$214: P_{7335} = (6, 4, 6, 1)$
$215: P_{7388} = (27, 5, 6, 1)$
$216: P_{7423} = (30, 6, 6, 1)$
$217: P_{7438} = (13, 7, 6, 1)$
$218: P_{7468} = (11, 8, 6, 1)$
$219: P_{7512} = (23, 9, 6, 1)$
$220: P_{7521} = (0, 10, 6, 1)$
$221: P_{7574} = (21, 11, 6, 1)$
$222: P_{7611} = (26, 12, 6, 1)$
$223: P_{7640} = (23, 13, 6, 1)$
$224: P_{7650} = (1, 14, 6, 1)$
$225: P_{7711} = (30, 15, 6, 1)$
$226: P_{7722} = (9, 16, 6, 1)$
$227: P_{7758} = (13, 17, 6, 1)$
$228: P_{7798} = (21, 18, 6, 1)$
$229: P_{7825} = (16, 19, 6, 1)$
$230: P_{7861} = (20, 20, 6, 1)$
$231: P_{7897} = (24, 21, 6, 1)$
$232: P_{7930} = (25, 22, 6, 1)$
$233: P_{7962} = (25, 23, 6, 1)$
$234: P_{7980} = (11, 24, 6, 1)$
$235: P_{8028} = (27, 25, 6, 1)$
$236: P_{8057} = (24, 26, 6, 1)$
$237: P_{8096} = (31, 27, 6, 1)$
$238: P_{8128} = (31, 28, 6, 1)$
$239: P_{8138} = (9, 29, 6, 1)$
$240: P_{8187} = (26, 30, 6, 1)$
$241: P_{8209} = (16, 31, 6, 1)$
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648 : $P_{22126} = (13, 18, 20, 1)$
649 : $P_{22148} = (3, 19, 20, 1)$
650 : $P_{22196} = (19, 20, 20, 1)$
651 : $P_{22236} = (27, 21, 20, 1)$
652 : $P_{22252} = (11, 22, 20, 1)$
653 : $P_{22291} = (18, 23, 20, 1)$
654 : $P_{22311} = (6, 24, 20, 1)$
655 : $P_{22343} = (6, 25, 20, 1)$
656 : $P_{22372} = (3, 26, 20, 1)$
657 : $P_{22425} = (24, 27, 20, 1)$
658 : $P_{22440} = (7, 28, 20, 1)$
659 : $P_{22494} = (29, 29, 20, 1)$
660 : $P_{22498} = (1, 30, 20, 1)$
661 : $P_{22548} = (19, 31, 20, 1)$
662 : $P_{22654} = (29, 2, 21, 1)$
663 : $P_{22660} = (3, 3, 21, 1)$
664 : $P_{22700} = (11, 4, 21, 1)$
665 : $P_{22734} = (13, 5, 21, 1)$
666 : $P_{22764} = (11, 6, 21, 1)$
667 : $P_{22813} = (28, 7, 21, 1)$
668 : $P_{22846} = (29, 8, 21, 1)$
669 : $P_{22867} = (18, 9, 21, 1)$
670 : $P_{22883} = (2, 10, 21, 1)$
671 : $P_{22919} = (6, 11, 21, 1)$
672 : $P_{22945} = (0, 12, 21, 1)$
673 : $P_{22979} = (2, 13, 21, 1)$
674 : $P_{23036} = (27, 14, 21, 1)$
675 : $P_{23056} = (15, 15, 21, 1)$
676 : $P_{23079} = (6, 16, 21, 1)$
677 : $P_{23120} = (15, 17, 21, 1)$
678 : $P_{23144} = (7, 18, 21, 1)$
679 : $P_{23176} = (7, 19, 21, 1)$
680 : $P_{23225} = (24, 20, 21, 1)$
681 : $P_{23252} = (19, 21, 21, 1)$
682 : $P_{23285} = (20, 22, 21, 1)$
683 : $P_{23325} = (28, 23, 21, 1)$
684 : $P_{23353} = (24, 24, 21, 1)$
685 : $P_{23381} = (20, 25, 21, 1)$
686 : $P_{23394} = (1, 26, 21, 1)$
687 : $P_{23444} = (19, 27, 21, 1)$
688 : $P_{23470} = (13, 28, 21, 1)$
689 : $P_{23507} = (18, 29, 21, 1)$
690 : $P_{23524} = (3, 30, 21, 1)$
691 : $P_{23580} = (27, 31, 21, 1)$

692 : $P_{23680} = (31, 2, 22, 1)$
693 : $P_{23685} = (4, 3, 22, 1)$
694 : $P_{23734} = (21, 4, 22, 1)$
695 : $P_{23762} = (17, 5, 22, 1)$
696 : $P_{23808} = (31, 6, 22, 1)$
697 : $P_{23820} = (11, 7, 22, 1)$
698 : $P_{23842} = (1, 8, 22, 1)$
699 : $P_{23883} = (10, 9, 22, 1)$
700 : $P_{23922} = (17, 10, 22, 1)$
701 : $P_{23939} = (2, 11, 22, 1)$
702 : $P_{23994} = (25, 12, 22, 1)$
703 : $P_{24023} = (22, 13, 22, 1)$
704 : $P_{24035} = (2, 14, 22, 1)$
705 : $P_{24089} = (24, 15, 22, 1)$
706 : $P_{24108} = (11, 16, 22, 1)$
707 : $P_{24157} = (28, 17, 22, 1)$
708 : $P_{24185} = (24, 18, 22, 1)$
709 : $P_{24193} = (0, 19, 22, 1)$
710 : $P_{24254} = (29, 20, 22, 1)$
711 : $P_{24286} = (29, 21, 22, 1)$
712 : $P_{24299} = (10, 22, 22, 1)$
713 : $P_{24325} = (4, 23, 22, 1)$
714 : $P_{24381} = (28, 24, 22, 1)$
715 : $P_{24410} = (25, 25, 22, 1)$
716 : $P_{24433} = (16, 26, 22, 1)$
717 : $P_{24471} = (22, 27, 22, 1)$
718 : $P_{24499} = (18, 28, 22, 1)$
719 : $P_{24529} = (16, 29, 22, 1)$
720 : $P_{24563} = (18, 30, 22, 1)$
721 : $P_{24598} = (21, 31, 22, 1)$
722 : $P_{24689} = (16, 2, 23, 1)$
723 : $P_{24705} = (0, 3, 23, 1)$
724 : $P_{24747} = (10, 4, 23, 1)$
725 : $P_{24770} = (1, 5, 23, 1)$
726 : $P_{24823} = (22, 6, 23, 1)$
727 : $P_{24857} = (24, 7, 23, 1)$
728 : $P_{24882} = (17, 8, 23, 1)$
729 : $P_{24901} = (4, 9, 23, 1)$
730 : $P_{24957} = (28, 10, 23, 1)$
731 : $P_{24989} = (28, 11, 23, 1)$
732 : $P_{24995} = (2, 12, 23, 1)$
733 : $P_{25056} = (31, 13, 23, 1)$
734 : $P_{25082} = (25, 14, 23, 1)$
735 : $P_{25100} = (11, 15, 23, 1)$
736 : $P_{25146} = (25, 16, 23, 1)$
737 : $P_{25170} = (17, 17, 23, 1)$
738 : $P_{25203} = (18, 18, 23, 1)$
739 : $P_{25221} = (4, 19, 23, 1)$
740 : $P_{25271} = (22, 20, 23, 1)$
741 : $P_{25302} = (21, 21, 23, 1)$
742 : $P_{25334} = (21, 22, 23, 1)$
743 : $P_{25355} = (10, 23, 23, 1)$
744 : $P_{25379} = (2, 24, 23, 1)$
745 : $P_{25420} = (11, 25, 23, 1)$
746 : $P_{25459} = (18, 26, 23, 1)$
747 : $P_{25502} = (29, 27, 23, 1)$
748 : $P_{25529} = (24, 28, 23, 1)$
749 : $P_{25568} = (31, 29, 23, 1)$
750 : $P_{25585} = (16, 30, 23, 1)$
751 : $P_{25630} = (29, 31, 23, 1)$
752 : $P_{25719} = (22, 2, 24, 1)$
753 : $P_{25738} = (9, 3, 24, 1)$
754 : $P_{25774} = (13, 4, 24, 1)$
755 : $P_{25793} = (0, 5, 24, 1)$
756 : $P_{25840} = (15, 6, 24, 1)$
757 : $P_{25861} = (4, 7, 24, 1)$
758 : $P_{25905} = (16, 8, 24, 1)$
759 : $P_{25930} = (9, 9, 24, 1)$
760 : $P_{25965} = (12, 10, 24, 1)$
761 : $P_{26001} = (16, 11, 24, 1)$
762 : $P_{26029} = (12, 12, 24, 1)$
763 : $P_{26055} = (6, 13, 24, 1)$
764 : $P_{26104} = (23, 14, 24, 1)$
765 : $P_{26136} = (23, 15, 24, 1)$
766 : $P_{26159} = (14, 16, 24, 1)$
767 : $P_{26178} = (1, 17, 24, 1)$
768 : $P_{26231} = (22, 18, 24, 1)$
769 : $P_{26254} = (13, 19, 24, 1)$
770 : $P_{26298} = (25, 20, 24, 1)$
771 : $P_{26312} = (7, 21, 24, 1)$
772 : $P_{26355} = (18, 22, 24, 1)$
773 : $P_{26376} = (7, 23, 24, 1)$
774 : $P_{26415} = (14, 24, 24, 1)$
775 : $P_{26461} = (28, 25, 24, 1)$
776 : $P_{26469} = (4, 26, 24, 1)$
777 : $P_{26515} = (18, 27, 24, 1)$
778 : $P_{26557} = (28, 28, 24, 1)$
779 : $P_{26586} = (25, 29, 24, 1)$
780 : $P_{26599} = (6, 30, 24, 1)$
781 : $P_{26640} = (15, 31, 24, 1)$
782 : $P_{26746} = (25, 2, 25, 1)$
783 : $P_{26766} = (13, 3, 25, 1)$
784 : $P_{26803} = (18, 4, 25, 1)$
785 : $P_{26833} = (16, 5, 25, 1)$
786 : $P_{26855} = (6, 6, 25, 1)$
787 : $P_{26904} = (23, 7, 25, 1)$
788 : $P_{26913} = (0, 8, 25, 1)$
789 : $P_{26952} = (7, 9, 25, 1)$
790 : $P_{26978} = (1, 10, 25, 1)$
791 : $P_{27023} = (14, 11, 25, 1)$
792 : $P_{27064} = (23, 12, 25, 1)$
793 : $P_{27088} = (15, 13, 25, 1)$
794 : $P_{27117} = (12, 14, 25, 1)$
795 : $P_{27141} = (4, 15, 25, 1)$
796 : $P_{27197} = (28, 16, 25, 1)$
797 : $P_{27213} = (12, 17, 25, 1)$
798 : $P_{27261} = (28, 18, 25, 1)$
799 : $P_{27274} = (9, 19, 25, 1)$

$800: P_{27315} = (18, 20, 25, 1)$
$801: P_{27344} = (15, 21, 25, 1)$
$802: P_{27374} = (13, 22, 25, 1)$
$803: P_{27402} = (9, 23, 25, 1)$
$804: P_{27441} = (16, 24, 25, 1)$
$805: P_{27471} = (14, 25, 25, 1)$
$806: P_{27495} = (6, 26, 25, 1)$
$807: P_{27546} = (25, 27, 25, 1)$
$808: P_{27575} = (22, 28, 25, 1)$
$809: P_{27607} = (22, 29, 25, 1)$
$810: P_{27621} = (4, 30, 25, 1)$
$811: P_{27656} = (7, 31, 25, 1)$
$812: P_{27772} = (27, 2, 26, 1)$
$813: P_{27787} = (10, 3, 26, 1)$
$814: P_{27821} = (12, 4, 26, 1)$
$815: P_{27853} = (12, 5, 26, 1)$
$816: P_{27891} = (18, 6, 26, 1)$
$817: P_{27905} = (0, 7, 26, 1)$
$818: P_{27965} = (28, 8, 26, 1)$
$819: P_{28000} = (31, 9, 26, 1)$
$820: P_{28019} = (18, 10, 26, 1)$
$821: P_{28043} = (10, 11, 26, 1)$
$822: P_{28079} = (14, 12, 26, 1)$
$823: P_{28124} = (27, 13, 26, 1)$
$824: P_{28150} = (21, 14, 26, 1)$
$825: P_{28180} = (19, 15, 26, 1)$
$826: P_{28210} = (17, 16, 26, 1)$
$827: P_{28256} = (31, 17, 26, 1)$
$828: P_{28260} = (3, 18, 26, 1)$
$829: P_{28303} = (14, 19, 26, 1)$
$830: P_{28344} = (23, 20, 26, 1)$
$831: P_{28354} = (1, 21, 26, 1)$
$832: P_{28404} = (19, 22, 26, 1)$
$833: P_{28434} = (17, 23, 26, 1)$
$834: P_{28469} = (20, 24, 26, 1)$
$835: P_{28484} = (3, 25, 26, 1)$
$836: P_{28536} = (23, 26, 26, 1)$
$837: P_{28573} = (28, 27, 26, 1)$
$838: P_{28586} = (9, 28, 26, 1)$
$839: P_{28629} = (20, 29, 26, 1)$
$840: P_{28662} = (21, 30, 26, 1)$
$841: P_{28682} = (9, 31, 26, 1)$
$842: P_{28789} = (20, 2, 27, 1)$
$843: P_{28815} = (14, 3, 27, 1)$
$844: P_{28852} = (19, 4, 27, 1)$
$845: P_{28893} = (28, 5, 27, 1)$
$846: P_{28924} = (27, 6, 27, 1)$
$847: P_{28948} = (19, 7, 27, 1)$
$848: P_{28973} = (12, 8, 27, 1)$
$849: P_{29010} = (17, 9, 27, 1)$
$850: P_{29056} = (31, 10, 27, 1)$
$851: P_{29077} = (20, 11, 27, 1)$
$852: P_{29110} = (21, 12, 27, 1)$
$853: P_{29139} = (18, 13, 27, 1)$
$854: P_{29167} = (14, 14, 27, 1)$
$855: P_{29185} = (0, 15, 27, 1)$
$856: P_{29220} = (3, 16, 27, 1)$
$857: P_{29267} = (18, 17, 27, 1)$
$858: P_{29290} = (9, 18, 27, 1)$
$859: P_{29323} = (10, 19, 27, 1)$
$860: P_{29373} = (28, 20, 27, 1)$
$861: P_{29386} = (9, 21, 27, 1)$
$862: P_{29421} = (12, 22, 27, 1)$
$863: P_{29472} = (31, 23, 27, 1)$
$864: P_{29483} = (10, 24, 27, 1)$
$865: P_{29522} = (17, 25, 27, 1)$
$866: P_{29558} = (21, 26, 27, 1)$
$867: P_{29592} = (23, 27, 27, 1)$
$868: P_{29604} = (3, 28, 27, 1)$
$869: P_{29660} = (27, 29, 27, 1)$
$870: P_{29688} = (23, 30, 27, 1)$
$871: P_{29698} = (1, 31, 27, 1)$
$872: P_{29801} = (8, 2, 28, 1)$
$873: P_{29826} = (1, 3, 28, 1)$
$874: P_{29879} = (22, 4, 28, 1)$
$875: P_{29894} = (5, 5, 28, 1)$
$876: P_{29950} = (29, 6, 28, 1)$
$877: P_{29960} = (7, 7, 28, 1)$
$878: P_{30006} = (21, 8, 28, 1)$
$879: P_{30038} = (21, 9, 28, 1)$
$880: P_{30071} = (22, 10, 28, 1)$
$881: P_{30090} = (9, 11, 28, 1)$
$882: P_{30144} = (31, 12, 28, 1)$
$883: P_{30165} = (20, 13, 28, 1)$
$884: P_{30181} = (4, 14, 28, 1)$
$885: P_{30229} = (20, 15, 28, 1)$
$886: P_{30256} = (15, 16, 28, 1)$
$887: P_{30300} = (27, 17, 28, 1)$
$888: P_{30307} = (2, 18, 28, 1)$
$889: P_{30342} = (5, 19, 28, 1)$
$890: P_{30384} = (15, 20, 28, 1)$
$891: P_{30424} = (23, 21, 28, 1)$
$892: P_{30442} = (9, 22, 28, 1)$
$893: P_{30492} = (27, 23, 28, 1)$
$894: P_{30520} = (23, 24, 28, 1)$
$895: P_{30558} = (29, 25, 28, 1)$
$896: P_{30561} = (0, 26, 28, 1)$
$897: P_{30597} = (4, 27, 28, 1)$
$898: P_{30633} = (8, 28, 28, 1)$
$899: P_{30664} = (7, 29, 28, 1)$
$900: P_{30691} = (2, 30, 28, 1)$
$901: P_{30752} = (31, 31, 28, 1)$
$902: P_{30824} = (7, 2, 29, 1)$
$903: P_{30854} = (5, 3, 29, 1)$
$904: P_{30890} = (9, 4, 29, 1)$
$905: P_{30934} = (21, 5, 29, 1)$
$906: P_{30965} = (20, 6, 29, 1)$
$907: P_{30997} = (20, 7, 29, 1)$

908 : $P_{31014} = (5, 8, 29, 1)$
909 : $P_{31068} = (27, 9, 29, 1)$
910 : $P_{31100} = (27, 10, 29, 1)$
911 : $P_{31128} = (23, 11, 29, 1)$
912 : $P_{31141} = (4, 12, 29, 1)$
913 : $P_{31198} = (29, 13, 29, 1)$
914 : $P_{31232} = (31, 14, 29, 1)$
915 : $P_{31240} = (7, 15, 29, 1)$
916 : $P_{31294} = (29, 16, 29, 1)$
917 : $P_{31319} = (22, 17, 29, 1)$
918 : $P_{31337} = (8, 18, 29, 1)$
919 : $P_{31362} = (1, 19, 29, 1)$
920 : $P_{31397} = (4, 20, 29, 1)$
921 : $P_{31456} = (31, 21, 29, 1)$
922 : $P_{31479} = (22, 22, 29, 1)$
923 : $P_{31510} = (21, 23, 29, 1)$
924 : $P_{31530} = (9, 24, 29, 1)$
925 : $P_{31568} = (15, 25, 29, 1)$
926 : $P_{31587} = (2, 26, 29, 1)$
927 : $P_{31632} = (15, 27, 29, 1)$
928 : $P_{31651} = (2, 28, 29, 1)$
929 : $P_{31689} = (8, 29, 29, 1)$
930 : $P_{31713} = (0, 30, 29, 1)$
931 : $P_{31768} = (23, 31, 29, 1)$
932 : $P_{31846} = (5, 2, 30, 1)$
933 : $P_{31875} = (2, 3, 30, 1)$
934 : $P_{31928} = (23, 4, 30, 1)$
935 : $P_{31946} = (9, 5, 30, 1)$
936 : $P_{31969} = (0, 6, 30, 1)$
937 : $P_{32004} = (3, 7, 30, 1)$
938 : $P_{32058} = (25, 8, 30, 1)$
939 : $P_{32068} = (3, 9, 30, 1)$
940 : $P_{32105} = (8, 10, 30, 1)$
941 : $P_{32148} = (19, 11, 30, 1)$
942 : $P_{32190} = (29, 12, 30, 1)$
943 : $P_{32202} = (9, 13, 30, 1)$
944 : $P_{32231} = (6, 14, 30, 1)$
945 : $P_{32273} = (16, 15, 30, 1)$
946 : $P_{32305} = (16, 16, 30, 1)$
947 : $P_{32326} = (5, 17, 30, 1)$
948 : $P_{32376} = (23, 18, 30, 1)$
949 : $P_{32391} = (6, 19, 30, 1)$
950 : $P_{32418} = (1, 20, 30, 1)$
951 : $P_{32466} = (17, 21, 30, 1)$
952 : $P_{32489} = (8, 22, 30, 1)$
953 : $P_{32526} = (13, 23, 30, 1)$
954 : $P_{32558} = (13, 24, 30, 1)$
955 : $P_{32579} = (2, 25, 30, 1)$
956 : $P_{32628} = (19, 26, 30, 1)$
957 : $P_{32651} = (10, 27, 30, 1)$
958 : $P_{32702} = (29, 28, 30, 1)$
959 : $P_{32715} = (10, 29, 30, 1)$
960 : $P_{32754} = (17, 30, 30, 1)$
961 : $P_{32794} = (25, 31, 30, 1)$
962 : $P_{32875} = (10, 2, 31, 1)$
963 : $P_{32903} = (6, 3, 31, 1)$
964 : $P_{32937} = (8, 4, 31, 1)$
965 : $P_{32986} = (25, 5, 31, 1)$
966 : $P_{33002} = (9, 6, 31, 1)$
967 : $P_{33041} = (16, 7, 31, 1)$
968 : $P_{33066} = (9, 8, 31, 1)$
969 : $P_{33102} = (13, 9, 31, 1)$
970 : $P_{33126} = (5, 10, 31, 1)$
971 : $P_{33166} = (13, 11, 31, 1)$
972 : $P_{33191} = (6, 12, 31, 1)$
973 : $P_{33217} = (0, 13, 31, 1)$
974 : $P_{33278} = (29, 14, 31, 1)$
975 : $P_{33284} = (3, 15, 31, 1)$
976 : $P_{33315} = (2, 16, 31, 1)$
977 : $P_{33353} = (8, 17, 31, 1)$
978 : $P_{33406} = (29, 18, 31, 1)$
979 : $P_{33411} = (2, 19, 31, 1)$
980 : $P_{33451} = (10, 20, 31, 1)$
981 : $P_{33498} = (25, 21, 31, 1)$
982 : $P_{33528} = (23, 22, 31, 1)$
983 : $P_{33540} = (3, 23, 31, 1)$
984 : $P_{33588} = (19, 24, 31, 1)$
985 : $P_{33617} = (16, 25, 31, 1)$
986 : $P_{33650} = (17, 26, 31, 1)$
987 : $P_{33666} = (1, 27, 31, 1)$
988 : $P_{33720} = (23, 28, 31, 1)$
989 : $P_{33734} = (5, 29, 31, 1)$
990 : $P_{33780} = (19, 30, 31, 1)$
991 : $P_{33810} = (17, 31, 31, 1)$

Line Intersection Graph

	0 1 2
0	0 1 1
1	1 0 0
2	1 0 0

Neighbor sets in the line intersection graph:
Line 0 intersects

Line	ℓ_1	ℓ_2
in point	P_0	P_2

Line 1 intersects

Line	ℓ_0
in point	P_0

Line 2 intersects

Line	ℓ_0
in point	P_2

The surface has 1089 points:
Too many to print.