Rank-74531 over GF(32)

January 15, 2021

The equation

The equation of the surface is :

$$X_0^2X_2 + X_1^2X_2 + X_1^2X_3 + X_0X_3^2 + X_0X_1X_2 = 0$$

(0, 0, 0, 0, 0, 1, 0, 0, 1, 1, 0, 0, 0, 1, 0, 0, 1, 0, 0, 0)
The point rank of the equation over GF(32) is 1141933093

General information

Number of lines	4
Number of points	1089
Number of singular points	1
Number of Eckardt points	0
Number of double points	4
Number of single points	124
Number of points off lines	961
Number of Hesse planes	0
Number of axes	0
Type of points on lines	33^4
Type of lines on points	2^4, 1^{124}, 0^{961}

Singular Points

The surface has 1 singular points:

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

The 4 Lines

The lines and their Pluecker coordinates are:

$$\ell_0 = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \end{bmatrix}_0 = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \end{bmatrix}_0 = \mathbf{Pl}(1,0,0,0,0,0)_0$$

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

$$\ell_2 = \begin{bmatrix} 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{1083424} = \begin{bmatrix} 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{1083424} = \mathbf{Pl}(0,1,0,0,0,0)_{1}$$

$$\ell_3 = \begin{bmatrix} 1 & 0 & 1 & 1 \\ 0 & 1 & 1 & 1 \end{bmatrix}_{34914} = \begin{bmatrix} 1 & 0 & 1 & 1 \\ 0 & 1 & 1 & 1 \end{bmatrix}_{34914} = \mathbf{Pl}(1,0,1,1,1,1)_{70563}$$

Rank of lines: (0, 1082369, 1083424, 34914)
Rank of points on Klein quadric: (0, 36865, 1, 70563)

Eckardt Points

The surface has 0 Eckardt points:

Double Points

The surface has 4 Double points:
The double points on the surface are:

$P_1 = (0,1,0,0) = \ell_0 \cap \ell_1$
$P_5 = (1,1,0,0) = \ell_0 \cap \ell_3$
$P_{2082} = (0,0,1,1) = \ell_1 \cap \ell_2$
$P_{2114} = (0,1,1,1) = \ell_1 \cap \ell_3$

Single Points

The surface has 124 single points:
The single points on the surface are:

0 : $P_0 = (1,0,0,0)$ lies on line ℓ_0
1 : $P_2 = (0,0,1,0)$ lies on line ℓ_2
2 : $P_3 = (0,0,0,1)$ lies on line ℓ_2
3 : $P_6 = (2,1,0,0)$ lies on line ℓ_0
4 : $P_7 = (3,1,0,0)$ lies on line ℓ_0
5 : $P_8 = (4,1,0,0)$ lies on line ℓ_0
6 : $P_9 = (5,1,0,0)$ lies on line ℓ_0
7 : $P_{10} = (6,1,0,0)$ lies on line ℓ_0
8 : $P_{11} = (7,1,0,0)$ lies on line ℓ_0
9 : $P_{12} = (8,1,0,0)$ lies on line ℓ_0
10 : $P_{13} = (9,1,0,0)$ lies on line ℓ_0
11 : $P_{14} = (10,1,0,0)$ lies on line ℓ_0
12 : $P_{15} = (11,1,0,0)$ lies on line ℓ_0
13 : $P_{16} = (12,1,0,0)$ lies on line ℓ_0
14 : $P_{17} = (13,1,0,0)$ lies on line ℓ_0
15 : $P_{18} = (14,1,0,0)$ lies on line ℓ_0
16 : $P_{19} = (15,1,0,0)$ lies on line ℓ_0
17 : $P_{20} = (16,1,0,0)$ lies on line ℓ_0
18 : $P_{21} = (17,1,0,0)$ lies on line ℓ_0
19 : $P_{22} = (18,1,0,0)$ lies on line ℓ_0
20 : $P_{23} = (19,1,0,0)$ lies on line ℓ_0
21 : $P_{24} = (20,1,0,0)$ lies on line ℓ_0
22 : $P_{25} = (21,1,0,0)$ lies on line ℓ_0
23 : $P_{26} = (22,1,0,0)$ lies on line ℓ_0
24 : $P_{27} = (23,1,0,0)$ lies on line ℓ_0
25 : $P_{28} = (24,1,0,0)$ lies on line ℓ_0
26 : $P_{29} = (25,1,0,0)$ lies on line ℓ_0
27 : $P_{30} = (26,1,0,0)$ lies on line ℓ_0
28 : $P_{31} = (27,1,0,0)$ lies on line ℓ_0
29 : $P_{32} = (28,1,0,0)$ lies on line ℓ_0
30 : $P_{33} = (29,1,0,0)$ lies on line ℓ_0
31 : $P_{34} = (30,1,0,0)$ lies on line ℓ_0
32 : $P_{35} = (31,1,0,0)$ lies on line ℓ_0
33 : $P_{2083} = (1,0,1,1)$ lies on line ℓ_3
34 : $P_{2145} = (0,2,1,1)$ lies on line ℓ_1
35 : $P_{2148} = (3,2,1,1)$ lies on line ℓ_3
36 : $P_{2177} = (0,3,1,1)$ lies on line ℓ_1
37 : $P_{2179} = (2,3,1,1)$ lies on line ℓ_3
38 : $P_{2209} = (0,4,1,1)$ lies on line ℓ_1
39 : $P_{2214} = (5,4,1,1)$ lies on line ℓ_3
40 : $P_{2241} = (0,5,1,1)$ lies on line ℓ_1
41 : $P_{2245} = (4,5,1,1)$ lies on line ℓ_3
42 : $P_{2273} = (0,6,1,1)$ lies on line ℓ_1
43 : $P_{2280} = (7,6,1,1)$ lies on line ℓ_3

44 : $P_{2305} = (0, 7, 1, 1)$ lies on line ℓ_1
45 : $P_{2311} = (6, 7, 1, 1)$ lies on line ℓ_3
46 : $P_{2337} = (0, 8, 1, 1)$ lies on line ℓ_1
47 : $P_{2346} = (9, 8, 1, 1)$ lies on line ℓ_3
48 : $P_{2369} = (0, 9, 1, 1)$ lies on line ℓ_1
49 : $P_{2377} = (8, 9, 1, 1)$ lies on line ℓ_3
50 : $P_{2401} = (0, 10, 1, 1)$ lies on line ℓ_1
51 : $P_{2412} = (11, 10, 1, 1)$ lies on line ℓ_3
52 : $P_{2433} = (0, 11, 1, 1)$ lies on line ℓ_1
53 : $P_{2443} = (10, 11, 1, 1)$ lies on line ℓ_3
54 : $P_{2465} = (0, 12, 1, 1)$ lies on line ℓ_1
55 : $P_{2478} = (13, 12, 1, 1)$ lies on line ℓ_3
56 : $P_{2497} = (0, 13, 1, 1)$ lies on line ℓ_1
57 : $P_{2509} = (12, 13, 1, 1)$ lies on line ℓ_3
58 : $P_{2529} = (0, 14, 1, 1)$ lies on line ℓ_1
59 : $P_{2544} = (15, 14, 1, 1)$ lies on line ℓ_3
60 : $P_{2561} = (0, 15, 1, 1)$ lies on line ℓ_1
61 : $P_{2575} = (14, 15, 1, 1)$ lies on line ℓ_3
62 : $P_{2593} = (0, 16, 1, 1)$ lies on line ℓ_1
63 : $P_{2610} = (17, 16, 1, 1)$ lies on line ℓ_3
64 : $P_{2625} = (0, 17, 1, 1)$ lies on line ℓ_1
65 : $P_{2641} = (16, 17, 1, 1)$ lies on line ℓ_3
66 : $P_{2657} = (0, 18, 1, 1)$ lies on line ℓ_1
67 : $P_{2676} = (19, 18, 1, 1)$ lies on line ℓ_3
68 : $P_{2689} = (0, 19, 1, 1)$ lies on line ℓ_1
69 : $P_{2707} = (18, 19, 1, 1)$ lies on line ℓ_3
70 : $P_{2721} = (0, 20, 1, 1)$ lies on line ℓ_1
71 : $P_{2742} = (21, 20, 1, 1)$ lies on line ℓ_3
72 : $P_{2753} = (0, 21, 1, 1)$ lies on line ℓ_1
73 : $P_{2773} = (20, 21, 1, 1)$ lies on line ℓ_3
74 : $P_{2785} = (0, 22, 1, 1)$ lies on line ℓ_1
75 : $P_{2808} = (23, 22, 1, 1)$ lies on line ℓ_3
76 : $P_{2817} = (0, 23, 1, 1)$ lies on line ℓ_1
77 : $P_{2839} = (22, 23, 1, 1)$ lies on line ℓ_3
78 : $P_{2849} = (0, 24, 1, 1)$ lies on line ℓ_1
79 : $P_{2874} = (25, 24, 1, 1)$ lies on line ℓ_3
80 : $P_{2881} = (0, 25, 1, 1)$ lies on line ℓ_1
81 : $P_{2905} = (24, 25, 1, 1)$ lies on line ℓ_3
82 : $P_{2913} = (0, 26, 1, 1)$ lies on line ℓ_1
83 : $P_{2940} = (27, 26, 1, 1)$ lies on line ℓ_3
84 : $P_{2945} = (0, 27, 1, 1)$ lies on line ℓ_1
85 : $P_{2971} = (26, 27, 1, 1)$ lies on line ℓ_3
86 : $P_{2977} = (0, 28, 1, 1)$ lies on line ℓ_1
87 : $P_{3006} = (29, 28, 1, 1)$ lies on line ℓ_3
88 : $P_{3009} = (0, 29, 1, 1)$ lies on line ℓ_1
89 : $P_{3037} = (28, 29, 1, 1)$ lies on line ℓ_3
90 : $P_{3041} = (0, 30, 1, 1)$ lies on line ℓ_1
91 : $P_{3072} = (31, 30, 1, 1)$ lies on line ℓ_3
92 : $P_{3073} = (0, 31, 1, 1)$ lies on line ℓ_1
93 : $P_{3103} = (30, 31, 1, 1)$ lies on line ℓ_3
94 : $P_{3105} = (0, 0, 2, 1)$ lies on line ℓ_2
95 : $P_{4129} = (0, 0, 3, 1)$ lies on line ℓ_2
96 : $P_{5153} = (0, 0, 4, 1)$ lies on line ℓ_2
97 : $P_{6177} = (0, 0, 5, 1)$ lies on line ℓ_2
98 : $P_{7201} = (0, 0, 6, 1)$ lies on line ℓ_2
99 : $P_{8225} = (0, 0, 7, 1)$ lies on line ℓ_2
100 : $P_{9249} = (0, 0, 8, 1)$ lies on line ℓ_2
101 : $P_{10273} = (0, 0, 9, 1)$ lies on line ℓ_2
102 : $P_{11297} = (0, 0, 10, 1)$ lies on line ℓ_2
103 : $P_{12321} = (0, 0, 11, 1)$ lies on line ℓ_2
104 : $P_{13345} = (0, 0, 12, 1)$ lies on line ℓ_2
105 : $P_{14369} = (0, 0, 13, 1)$ lies on line ℓ_2
106 : $P_{15393} = (0, 0, 14, 1)$ lies on line ℓ_2
107 : $P_{16417} = (0, 0, 15, 1)$ lies on line ℓ_2
108 : $P_{17441} = (0, 0, 16, 1)$ lies on line ℓ_2
109 : $P_{18465} = (0, 0, 17, 1)$ lies on line ℓ_2
110 : $P_{19489} = (0, 0, 18, 1)$ lies on line ℓ_2
111 : $P_{20513} = (0, 0, 19, 1)$ lies on line ℓ_2
112 : $P_{21537} = (0, 0, 20, 1)$ lies on line ℓ_2
113 : $P_{22561} = (0, 0, 21, 1)$ lies on line ℓ_2
114 : $P_{23585} = (0, 0, 22, 1)$ lies on line ℓ_2
115 : $P_{24609} = (0, 0, 23, 1)$ lies on line ℓ_2
116 : $P_{25633} = (0, 0, 24, 1)$ lies on line ℓ_2
117 : $P_{26657} = (0, 0, 25, 1)$ lies on line ℓ_2
118 : $P_{27681} = (0, 0, 26, 1)$ lies on line ℓ_2
119 : $P_{28705} = (0, 0, 27, 1)$ lies on line ℓ_2
120 : $P_{29729} = (0, 0, 28, 1)$ lies on line ℓ_2
121 : $P_{30753} = (0, 0, 29, 1)$ lies on line ℓ_2
122 : $P_{31777} = (0, 0, 30, 1)$ lies on line ℓ_2
123 : $P_{32801} = (0, 0, 31, 1)$ 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 : $P_{1091} = (1, 1, 0, 1)$
1 : $P_{1126} = (4, 2, 0, 1)$
2 : $P_{1159} = (5, 3, 0, 1)$
3 : $P_{1202} = (16, 4, 0, 1)$
4 : $P_{1235} = (17, 5, 0, 1)$
5 : $P_{1270} = (20, 6, 0, 1)$

$6: P_{1303} = (21, 7, 0, 1)$
$7: P_{1324} = (10, 8, 0, 1)$
$8: P_{1357} = (11, 9, 0, 1)$
$9: P_{1392} = (14, 10, 0, 1)$
$10: P_{1425} = (15, 11, 0, 1)$
$11: P_{1468} = (26, 12, 0, 1)$
$12: P_{1501} = (27, 13, 0, 1)$
$13: P_{1536} = (30, 14, 0, 1)$
$14: P_{1569} = (31, 15, 0, 1)$
$15: P_{1583} = (13, 16, 0, 1)$
$16: P_{1614} = (12, 17, 0, 1)$
$17: P_{1643} = (9, 18, 0, 1)$
$18: P_{1674} = (8, 19, 0, 1)$
$19: P_{1727} = (29, 20, 0, 1)$
$20: P_{1758} = (28, 21, 0, 1)$
$21: P_{1787} = (25, 22, 0, 1)$
$22: P_{1818} = (24, 23, 0, 1)$
$23: P_{1833} = (7, 24, 0, 1)$
$24: P_{1864} = (6, 25, 0, 1)$
$25: P_{1893} = (3, 26, 0, 1)$
$26: P_{1924} = (2, 27, 0, 1)$
$27: P_{1977} = (23, 28, 0, 1)$
$28: P_{2008} = (22, 29, 0, 1)$
$29: P_{2037} = (19, 30, 0, 1)$
$30: P_{2068} = (18, 31, 0, 1)$
$31: P_{3123} = (18, 0, 2, 1)$
$32: P_{3148} = (11, 1, 2, 1)$
$33: P_{3161} = (24, 1, 2, 1)$
$34: P_{3211} = (10, 3, 2, 1)$
$35: P_{3228} = (27, 3, 2, 1)$
$36: P_{3240} = (7, 4, 2, 1)$
$37: P_{3250} = (17, 4, 2, 1)$
$38: P_{3561} = (8, 14, 2, 1)$
$39: P_{3573} = (20, 14, 2, 1)$
$40: P_{3595} = (10, 15, 2, 1)$
$41: P_{3608} = (23, 15, 2, 1)$
$42: P_{3626} = (9, 16, 2, 1)$
$43: P_{3628} = (11, 16, 2, 1)$
$44: P_{3673} = (24, 17, 2, 1)$
$45: P_{3676} = (27, 17, 2, 1)$
$46: P_{3696} = (15, 18, 2, 1)$
$47: P_{3793} = (16, 21, 2, 1)$
$48: P_{3800} = (23, 21, 2, 1)$
$49: P_{3825} = (16, 22, 2, 1)$
$50: P_{3829} = (20, 22, 2, 1)$
$51: P_{3866} = (25, 23, 2, 1)$
$52: P_{3869} = (28, 23, 2, 1)$
$53: P_{3878} = (5, 24, 2, 1)$
$54: P_{3888} = (15, 24, 2, 1)$
$55: P_{3954} = (17, 26, 2, 1)$
$56: P_{3962} = (25, 26, 2, 1)$
$57: P_{4019} = (18, 28, 2, 1)$
$58: P_{4029} = (28, 28, 2, 1)$
$59: P_{4040} = (7, 29, 2, 1)$
$60: P_{4041} = (8, 29, 2, 1)$
$61: P_{4070} = (5, 30, 2, 1)$
$62: P_{4074} = (9, 30, 2, 1)$
$63: P_{4157} = (28, 0, 3, 1)$
$64: P_{4207} = (14, 2, 3, 1)$
$65: P_{4209} = (16, 2, 3, 1)$
$66: P_{4272} = (15, 4, 3, 1)$
$67: P_{4280} = (23, 4, 3, 1)$
$68: P_{4366} = (13, 7, 3, 1)$
$69: P_{4375} = (22, 7, 3, 1)$
$70: P_{4424} = (7, 9, 3, 1)$
$71: P_{4435} = (18, 9, 3, 1)$
$72: P_{4450} = (1, 10, 3, 1)$
$73: P_{4472} = (23, 10, 3, 1)$
$74: P_{4495} = (14, 11, 3, 1)$
$75: P_{4506} = (25, 11, 3, 1)$
$76: P_{4522} = (9, 12, 3, 1)$
$77: P_{4538} = (25, 12, 3, 1)$
$78: P_{4723} = (18, 18, 3, 1)$
$79: P_{4733} = (28, 18, 3, 1)$
$80: P_{4743} = (6, 19, 3, 1)$
$81: P_{4746} = (9, 19, 3, 1)$
$82: P_{4839} = (6, 22, 3, 1)$
$83: P_{4845} = (12, 22, 3, 1)$
$84: P_{4930} = (1, 25, 3, 1)$
$85: P_{4933} = (4, 25, 3, 1)$
$86: P_{4977} = (16, 26, 3, 1)$
$87: P_{4983} = (22, 26, 3, 1)$
$88: P_{5037} = (12, 28, 3, 1)$
$89: P_{5102} = (13, 30, 3, 1)$
$90: P_{5104} = (15, 30, 3, 1)$
$91: P_{5125} = (4, 31, 3, 1)$
$92: P_{5128} = (7, 31, 3, 1)$
$93: P_{5162} = (9, 0, 4, 1)$
$94: P_{5192} = (7, 1, 4, 1)$
$95: P_{5200} = (15, 1, 4, 1)$
$96: P_{5255} = (6, 3, 4, 1)$
$97: P_{5261} = (12, 3, 4, 1)$
$98: P_{5315} = (2, 5, 4, 1)$
$99: P_{5327} = (14, 5, 4, 1)$
$100: P_{5394} = (17, 7, 4, 1)$
$101: P_{5408} = (31, 7, 4, 1)$
$102: P_{5472} = (31, 9, 4, 1)$
$103: P_{5539} = (2, 12, 4, 1)$
$104: P_{5544} = (7, 12, 4, 1)$
$105: P_{5580} = (11, 13, 4, 1)$
$106: P_{5584} = (15, 13, 4, 1)$
$107: P_{5677} = (12, 16, 4, 1)$
$108: P_{5686} = (21, 16, 4, 1)$
$109: P_{5772} = (11, 19, 4, 1)$
$110: P_{5778} = (17, 19, 4, 1)$
$111: P_{5867} = (10, 22, 4, 1)$
$112: P_{5878} = (21, 22, 4, 1)$
$113: P_{5898} = (9, 23, 4, 1)$

$114: P_{5912} = (23, 23, 4, 1)$
$115: P_{5927} = (6, 24, 4, 1)$
$116: P_{5944} = (23, 24, 4, 1)$
$117: P_{5966} = (13, 25, 4, 1)$
$118: P_{5982} = (29, 25, 4, 1)$
$119: P_{6062} = (13, 28, 4, 1)$
$120: P_{6073} = (24, 28, 4, 1)$
$121: P_{6123} = (10, 30, 4, 1)$
$122: P_{6142} = (29, 30, 4, 1)$
$123: P_{6159} = (14, 31, 4, 1)$
$124: P_{6169} = (24, 31, 4, 1)$
$125: P_{6200} = (23, 0, 5, 1)$
$126: P_{6286} = (13, 3, 5, 1)$
$127: P_{6298} = (25, 3, 5, 1)$
$128: P_{6318} = (13, 4, 5, 1)$
$129: P_{6335} = (30, 4, 5, 1)$
$130: P_{6370} = (1, 6, 5, 1)$
$131: P_{6385} = (16, 6, 5, 1)$
$132: P_{6444} = (11, 8, 5, 1)$
$133: P_{6453} = (20, 8, 5, 1)$
$134: P_{6474} = (9, 9, 5, 1)$
$135: P_{6488} = (23, 9, 5, 1)$
$136: P_{6538} = (9, 11, 5, 1)$
$137: P_{6550} = (21, 11, 5, 1)$
$138: P_{6626} = (1, 14, 5, 1)$
$139: P_{6649} = (24, 14, 5, 1)$
$140: P_{6663} = (6, 15, 5, 1)$
$141: P_{6687} = (30, 15, 5, 1)$
$142: P_{6713} = (24, 16, 5, 1)$
$143: P_{6720} = (31, 16, 5, 1)$
$144: P_{6769} = (16, 18, 5, 1)$
$145: P_{6774} = (21, 18, 5, 1)$
$146: P_{6812} = (27, 19, 5, 1)$
$147: P_{6816} = (31, 19, 5, 1)$
$148: P_{6874} = (25, 21, 5, 1)$
$149: P_{6876} = (27, 21, 5, 1)$
$150: P_{6939} = (26, 23, 5, 1)$
$151: P_{6997} = (20, 25, 5, 1)$
$152: P_{7003} = (26, 25, 5, 1)$
$153: P_{7015} = (6, 26, 5, 1)$
$154: P_{7020} = (11, 26, 5, 1)$
$155: P_{7215} = (14, 0, 6, 1)$
$156: P_{7253} = (20, 1, 6, 1)$
$157: P_{7260} = (27, 1, 6, 1)$
$158: P_{7271} = (6, 2, 6, 1)$
$159: P_{7275} = (10, 2, 6, 1)$
$160: P_{7330} = (1, 4, 6, 1)$
$161: P_{7340} = (11, 4, 6, 1)$
$162: P_{7490} = (1, 9, 6, 1)$
$163: P_{7495} = (6, 9, 6, 1)$
$164: P_{7597} = (12, 12, 6, 1)$
$165: P_{7599} = (14, 12, 6, 1)$
$166: P_{7662} = (13, 14, 6, 1)$
$167: P_{7685} = (4, 15, 6, 1)$
$168: P_{7686} = (5, 15, 6, 1)$
$169: P_{7721} = (8, 16, 6, 1)$
$170: P_{7735} = (22, 16, 6, 1)$
$171: P_{7814} = (5, 19, 6, 1)$
$172: P_{7833} = (24, 19, 6, 1)$
$173: P_{7852} = (11, 20, 6, 1)$
$174: P_{7858} = (17, 20, 6, 1)$
$175: P_{7886} = (13, 21, 6, 1)$
$176: P_{7895} = (22, 21, 6, 1)$
$177: P_{7945} = (8, 23, 6, 1)$
$178: P_{7954} = (17, 23, 6, 1)$
$179: P_{8045} = (12, 26, 6, 1)$
$180: P_{8057} = (24, 26, 6, 1)$
$181: P_{8165} = (4, 30, 6, 1)$
$182: P_{8181} = (20, 30, 6, 1)$
$183: P_{8203} = (10, 31, 6, 1)$
$184: P_{8220} = (27, 31, 6, 1)$
$185: P_{8237} = (12, 0, 7, 1)$
$186: P_{8262} = (5, 1, 7, 1)$
$187: P_{8265} = (8, 1, 7, 1)$
$188: P_{8339} = (18, 3, 7, 1)$
$189: P_{8350} = (29, 3, 7, 1)$
$190: P_{8451} = (2, 7, 7, 1)$
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598 : $P_{21640} = (7, 3, 20, 1)$
599 : $P_{21659} = (26, 3, 20, 1)$
600 : $P_{21679} = (14, 4, 20, 1)$
601 : $P_{21685} = (20, 4, 20, 1)$
602 : $P_{21800} = (7, 8, 20, 1)$
603 : $P_{21810} = (17, 8, 20, 1)$
604 : $P_{21890} = (1, 11, 20, 1)$
605 : $P_{21909} = (20, 11, 20, 1)$
606 : $P_{21963} = (10, 13, 20, 1)$
607 : $P_{21978} = (25, 13, 20, 1)$
608 : $P_{22050} = (1, 16, 20, 1)$
609 : $P_{22064} = (15, 16, 20, 1)$
610 : $P_{22115} = (2, 18, 20, 1)$
611 : $P_{22127} = (14, 18, 20, 1)$
612 : $P_{22161} = (16, 19, 20, 1)$
613 : $P_{22174} = (29, 19, 20, 1)$
614 : $P_{22315} = (10, 24, 20, 1)$
615 : $P_{22317} = (12, 24, 20, 1)$
616 : $P_{22395} = (26, 26, 20, 1)$
617 : $P_{22399} = (30, 26, 20, 1)$
618 : $P_{22458} = (25, 28, 20, 1)$
619 : $P_{22460} = (27, 28, 20, 1)$
620 : $P_{22477} = (12, 29, 20, 1)$
621 : $P_{22480} = (15, 29, 20, 1)$
622 : $P_{22524} = (27, 30, 20, 1)$
623 : $P_{22545} = (16, 31, 20, 1)$
624 : $P_{22546} = (17, 31, 20, 1)$
625 : $P_{22587} = (26, 0, 21, 1)$
626 : $P_{22603} = (10, 1, 21, 1)$
627 : $P_{22610} = (17, 1, 21, 1)$
628 : $P_{22640} = (15, 2, 21, 1)$
629 : $P_{22648} = (23, 2, 21, 1)$
630 : $P_{22658} = (1, 3, 21, 1)$
631 : $P_{22681} = (24, 3, 21, 1)$
632 : $P_{22730} = (9, 5, 21, 1)$
633 : $P_{22743} = (22, 5, 21, 1)$
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635 : $P_{22777} = (24, 6, 21, 1)$
636 : $P_{22920} = (7, 11, 21, 1)$
637 : $P_{22935} = (22, 11, 21, 1)$
638 : $P_{23140} = (3, 18, 21, 1)$
639 : $P_{23148} = (11, 18, 21, 1)$
640 : $P_{23192} = (23, 19, 21, 1)$
641 : $P_{23199} = (30, 19, 21, 1)$
642 : $P_{23237} = (4, 21, 21, 1)$
643 : $P_{23244} = (11, 21, 21, 1)$
644 : $P_{23268} = (3, 22, 21, 1)$
645 : $P_{23280} = (15, 22, 21, 1)$
646 : $P_{23346} = (17, 24, 21, 1)$
647 : $P_{23348} = (19, 24, 21, 1)$
648 : $P_{23370} = (9, 25, 21, 1)$
649 : $P_{23371} = (10, 25, 21, 1)$
650 : $P_{23412} = (19, 26, 21, 1)$
651 : $P_{23458} = (1, 28, 21, 1)$
652 : $P_{23464} = (7, 28, 21, 1)$
653 : $P_{23547} = (26, 30, 21, 1)$

654 : $P_{23551} = (30, 30, 21, 1)$
655 : $P_{23593} = (8, 0, 22, 1)$
656 : $P_{23633} = (16, 1, 22, 1)$
657 : $P_{23642} = (25, 1, 22, 1)$
658 : $P_{23669} = (20, 2, 22, 1)$
659 : $P_{23679} = (30, 2, 22, 1)$
660 : $P_{23750} = (5, 5, 22, 1)$
661 : $P_{23753} = (8, 5, 22, 1)$
662 : $P_{23845} = (4, 8, 22, 1)$
663 : $P_{23899} = (26, 9, 22, 1)$
664 : $P_{23900} = (27, 9, 22, 1)$
665 : $P_{23930} = (25, 10, 22, 1)$
666 : $P_{23932} = (27, 10, 22, 1)$
667 : $P_{23953} = (16, 11, 22, 1)$
668 : $P_{23956} = (19, 11, 22, 1)$
669 : $P_{24020} = (19, 13, 22, 1)$
670 : $P_{24023} = (22, 13, 22, 1)$
671 : $P_{24059} = (26, 14, 22, 1)$
672 : $P_{24061} = (28, 14, 22, 1)$
673 : $P_{24134} = (5, 17, 22, 1)$
674 : $P_{24157} = (28, 17, 22, 1)$
675 : $P_{24260} = (3, 21, 22, 1)$
676 : $P_{24287} = (30, 21, 22, 1)$
677 : $P_{24357} = (4, 24, 22, 1)$
678 : $P_{24373} = (20, 24, 22, 1)$
679 : $P_{24388} = (3, 25, 22, 1)$
680 : $P_{24403} = (18, 25, 22, 1)$
681 : $P_{24450} = (1, 27, 22, 1)$
682 : $P_{24467} = (18, 27, 22, 1)$
683 : $P_{24578} = (1, 31, 22, 1)$
684 : $P_{24599} = (22, 31, 22, 1)$
685 : $P_{24614} = (5, 0, 23, 1)$
686 : $P_{24667} = (26, 1, 23, 1)$
687 : $P_{24671} = (30, 1, 23, 1)$
688 : $P_{24779} = (10, 5, 23, 1)$
689 : $P_{24818} = (17, 6, 23, 1)$
690 : $P_{24819} = (18, 6, 23, 1)$
691 : $P_{24870} = (5, 8, 23, 1)$
692 : $P_{24873} = (8, 8, 23, 1)$
693 : $P_{24936} = (7, 10, 23, 1)$
694 : $P_{24937} = (8, 10, 23, 1)$
695 : $P_{24978} = (17, 11, 23, 1)$
696 : $P_{24992} = (31, 11, 23, 1)$
697 : $P_{24999} = (6, 12, 23, 1)$
698 : $P_{25008} = (15, 12, 23, 1)$
699 : $P_{25128} = (7, 16, 23, 1)$
700 : $P_{25139} = (18, 16, 23, 1)$
701 : $P_{25154} = (1, 17, 23, 1)$
702 : $P_{25174} = (21, 17, 23, 1)$
703 : $P_{25264} = (15, 20, 23, 1)$
704 : $P_{25279} = (30, 20, 23, 1)$
705 : $P_{25291} = (10, 21, 23, 1)$
706 : $P_{25307} = (26, 21, 23, 1)$
707 : $P_{25358} = (13, 23, 23, 1)$
708 : $P_{25376} = (31, 23, 23, 1)$
709 : $P_{25378} = (1, 24, 23, 1)$
710 : $P_{25405} = (28, 24, 23, 1)$
711 : $P_{25550} = (13, 29, 23, 1)$
712 : $P_{25558} = (21, 29, 23, 1)$
713 : $P_{25607} = (6, 31, 23, 1)$
714 : $P_{25629} = (28, 31, 23, 1)$
715 : $P_{25650} = (17, 0, 24, 1)$
716 : $P_{25668} = (3, 1, 24, 1)$
717 : $P_{25684} = (19, 1, 24, 1)$
718 : $P_{25858} = (1, 7, 24, 1)$
719 : $P_{25880} = (23, 7, 24, 1)$
720 : $P_{25963} = (10, 10, 24, 1)$
721 : $P_{25970} = (17, 10, 24, 1)$
722 : $P_{26018} = (1, 12, 24, 1)$
723 : $P_{26045} = (28, 12, 24, 1)$
724 : $P_{26058} = (9, 13, 24, 1)$
725 : $P_{26070} = (21, 13, 24, 1)$
726 : $P_{26091} = (10, 14, 24, 1)$
727 : $P_{26102} = (21, 14, 24, 1)$
728 : $P_{26125} = (12, 15, 24, 1)$
729 : $P_{26131} = (18, 15, 24, 1)$
730 : $P_{26191} = (14, 17, 24, 1)$
731 : $P_{26229} = (20, 18, 24, 1)$
732 : $P_{26232} = (23, 18, 24, 1)$
733 : $P_{26282} = (9, 20, 24, 1)$
734 : $P_{26285} = (12, 20, 24, 1)$
735 : $P_{26364} = (27, 22, 24, 1)$
736 : $P_{26365} = (28, 22, 24, 1)$
737 : $P_{26419} = (18, 24, 24, 1)$
738 : $P_{26428} = (27, 24, 24, 1)$
739 : $P_{26485} = (20, 26, 24, 1)$
740 : $P_{26496} = (31, 26, 24, 1)$
741 : $P_{26532} = (3, 28, 24, 1)$
742 : $P_{26543} = (14, 28, 24, 1)$
743 : $P_{26580} = (19, 29, 24, 1)$
744 : $P_{26592} = (31, 29, 24, 1)$
745 : $P_{26667} = (10, 0, 25, 1)$
746 : $P_{26695} = (6, 1, 25, 1)$
747 : $P_{26702} = (13, 1, 25, 1)$
748 : $P_{26722} = (1, 2, 25, 1)$
749 : $P_{26730} = (9, 2, 25, 1)$
750 : $P_{26804} = (19, 4, 25, 1)$
751 : $P_{26814} = (29, 4, 25, 1)$
752 : $P_{26854} = (5, 6, 25, 1)$
753 : $P_{26858} = (9, 6, 25, 1)$
754 : $P_{26897} = (16, 7, 25, 1)$
755 : $P_{26910} = (29, 7, 25, 1)$
756 : $P_{26993} = (16, 10, 25, 1)$
757 : $P_{27011} = (2, 11, 25, 1)$
758 : $P_{27012} = (3, 11, 25, 1)$
759 : $P_{27058} = (17, 12, 25, 1)$
760 : $P_{27064} = (23, 12, 25, 1)$
761 : $P_{27107} = (2, 14, 25, 1)$

762 : $P_{27111} = (6, 14, 25, 1)$
763 : $P_{27145} = (8, 15, 25, 1)$
764 : $P_{27150} = (13, 15, 25, 1)$
765 : $P_{27211} = (10, 17, 25, 1)$
766 : $P_{27218} = (17, 17, 25, 1)$
767 : $P_{27234} = (1, 18, 25, 1)$
768 : $P_{27258} = (25, 18, 25, 1)$
769 : $P_{27529} = (8, 27, 25, 1)$
770 : $P_{27546} = (25, 27, 25, 1)$
771 : $P_{27558} = (5, 28, 25, 1)$
772 : $P_{27572} = (19, 28, 25, 1)$
773 : $P_{27620} = (3, 30, 25, 1)$
774 : $P_{27640} = (23, 30, 25, 1)$
775 : $P_{27702} = (21, 0, 26, 1)$
776 : $P_{27756} = (11, 2, 26, 1)$
777 : $P_{27773} = (28, 2, 26, 1)$
778 : $P_{27938} = (1, 8, 26, 1)$
779 : $P_{27965} = (28, 8, 26, 1)$
780 : $P_{27979} = (10, 9, 26, 1)$
781 : $P_{27991} = (22, 9, 26, 1)$
782 : $P_{28069} = (4, 12, 26, 1)$
783 : $P_{28094} = (29, 12, 26, 1)$
784 : $P_{28140} = (11, 14, 26, 1)$
785 : $P_{28145} = (16, 14, 26, 1)$
786 : $P_{28163} = (2, 15, 26, 1)$
787 : $P_{28185} = (24, 15, 26, 1)$
788 : $P_{28243} = (18, 17, 26, 1)$
789 : $P_{28247} = (22, 17, 26, 1)$
790 : $P_{28281} = (24, 18, 26, 1)$
791 : $P_{28288} = (31, 18, 26, 1)$
792 : $P_{28370} = (17, 21, 26, 1)$
793 : $P_{28386} = (1, 22, 26, 1)$
794 : $P_{28387} = (2, 22, 26, 1)$
795 : $P_{28465} = (16, 24, 26, 1)$
796 : $P_{28478} = (29, 24, 26, 1)$
797 : $P_{28549} = (4, 27, 26, 1)$
798 : $P_{28555} = (10, 27, 26, 1)$
799 : $P_{28626} = (17, 29, 26, 1)$
800 : $P_{28634} = (25, 29, 26, 1)$
801 : $P_{28659} = (18, 30, 26, 1)$
802 : $P_{28666} = (25, 30, 26, 1)$
803 : $P_{28694} = (21, 31, 26, 1)$
804 : $P_{28704} = (31, 31, 26, 1)$
805 : $P_{28736} = (31, 0, 27, 1)$
806 : $P_{28746} = (9, 1, 27, 1)$
807 : $P_{28760} = (23, 1, 27, 1)$
808 : $P_{28774} = (5, 2, 27, 1)$
809 : $P_{28793} = (24, 2, 27, 1)$
810 : $P_{28842} = (9, 4, 27, 1)$
811 : $P_{28851} = (18, 4, 27, 1)$
812 : $P_{28878} = (13, 5, 27, 1)$
813 : $P_{28888} = (23, 5, 27, 1)$
814 : $P_{28933} = (4, 7, 27, 1)$
815 : $P_{28957} = (28, 7, 27, 1)$
816 : $P_{29031} = (6, 10, 27, 1)$
817 : $P_{29044} = (19, 10, 27, 1)$
818 : $P_{29065} = (8, 11, 27, 1)$
819 : $P_{29085} = (28, 11, 27, 1)$
820 : $P_{29094} = (5, 12, 27, 1)$
821 : $P_{29111} = (22, 12, 27, 1)$
822 : $P_{29156} = (3, 14, 27, 1)$
823 : $P_{29171} = (18, 14, 27, 1)$
824 : $P_{29364} = (19, 20, 27, 1)$
825 : $P_{29369} = (24, 20, 27, 1)$
826 : $P_{29398} = (21, 21, 27, 1)$
827 : $P_{29408} = (31, 21, 27, 1)$
828 : $P_{29444} = (3, 23, 27, 1)$
829 : $P_{29452} = (11, 23, 27, 1)$
830 : $P_{29545} = (8, 26, 27, 1)$
831 : $P_{29550} = (13, 26, 27, 1)$
832 : $P_{29622} = (21, 28, 27, 1)$
833 : $P_{29623} = (22, 28, 27, 1)$
834 : $P_{29637} = (4, 29, 27, 1)$
835 : $P_{29639} = (6, 29, 27, 1)$
836 : $P_{29708} = (11, 31, 27, 1)$
837 : $P_{29732} = (3, 0, 28, 1)$
838 : $P_{29773} = (12, 1, 28, 1)$
839 : $P_{29775} = (14, 1, 28, 1)$
840 : $P_{29833} = (8, 3, 28, 1)$
841 : $P_{29881} = (24, 4, 28, 1)$
842 : $P_{29888} = (31, 4, 28, 1)$
843 : $P_{29890} = (1, 5, 28, 1)$
844 : $P_{29896} = (7, 5, 28, 1)$
845 : $P_{29932} = (11, 6, 28, 1)$
846 : $P_{29935} = (14, 6, 28, 1)$
847 : $P_{29961} = (8, 7, 28, 1)$
848 : $P_{29965} = (12, 7, 28, 1)$
849 : $P_{30004} = (19, 8, 28, 1)$
850 : $P_{30009} = (24, 8, 28, 1)$
851 : $P_{30022} = (5, 9, 28, 1)$
852 : $P_{30032} = (15, 9, 28, 1)$
853 : $P_{30230} = (21, 15, 28, 1)$
854 : $P_{30234} = (25, 15, 28, 1)$
855 : $P_{30284} = (11, 17, 28, 1)$
856 : $P_{30298} = (25, 17, 28, 1)$
857 : $P_{30340} = (3, 19, 28, 1)$
858 : $P_{30356} = (19, 19, 28, 1)$
859 : $P_{30376} = (7, 20, 28, 1)$
860 : $P_{30385} = (16, 20, 28, 1)$
861 : $P_{30466} = (1, 23, 28, 1)$
862 : $P_{30486} = (21, 23, 28, 1)$
863 : $P_{30534} = (5, 25, 28, 1)$
864 : $P_{30560} = (31, 25, 28, 1)$
865 : $P_{30640} = (15, 28, 28, 1)$
866 : $P_{30641} = (16, 28, 28, 1)$
867 : $P_{30772} = (19, 0, 29, 1)$
868 : $P_{30789} = (4, 1, 29, 1)$
869 : $P_{30807} = (22, 1, 29, 1)$

870 : $P_{30852} = (3, 3, 29, 1)$
871 : $P_{30868} = (19, 3, 29, 1)$
872 : $P_{30916} = (3, 5, 29, 1)$
873 : $P_{30934} = (21, 5, 29, 1)$
874 : $P_{30991} = (14, 7, 29, 1)$
875 : $P_{31003} = (26, 7, 29, 1)$
876 : $P_{31022} = (13, 8, 29, 1)$
877 : $P_{31031} = (22, 8, 29, 1)$
878 : $P_{31045} = (4, 9, 29, 1)$
879 : $P_{31071} = (30, 9, 29, 1)$
880 : $P_{31085} = (12, 10, 29, 1)$
881 : $P_{31094} = (21, 10, 29, 1)$
882 : $P_{31170} = (1, 13, 29, 1)$
883 : $P_{31200} = (31, 13, 29, 1)$
884 : $P_{31234} = (1, 15, 29, 1)$
885 : $P_{31262} = (29, 15, 29, 1)$
886 : $P_{31294} = (29, 16, 29, 1)$
887 : $P_{31295} = (30, 16, 29, 1)$
888 : $P_{31341} = (12, 18, 29, 1)$
889 : $P_{31342} = (13, 18, 29, 1)$
890 : $P_{31363} = (2, 19, 29, 1)$
891 : $P_{31483} = (26, 22, 29, 1)$
892 : $P_{31488} = (31, 22, 29, 1)$
893 : $P_{31491} = (2, 23, 29, 1)$
894 : $P_{31495} = (6, 23, 29, 1)$
895 : $P_{31623} = (6, 27, 29, 1)$
896 : $P_{31631} = (14, 27, 29, 1)$
897 : $P_{31797} = (20, 0, 30, 1)$
898 : $P_{31854} = (13, 2, 30, 1)$
899 : $P_{31868} = (27, 2, 30, 1)$
900 : $P_{32039} = (6, 8, 30, 1)$
901 : $P_{32059} = (26, 8, 30, 1)$
902 : $P_{32134} = (5, 11, 30, 1)$
903 : $P_{32155} = (26, 11, 30, 1)$
904 : $P_{32207} = (14, 13, 30, 1)$
905 : $P_{32216} = (23, 13, 30, 1)$
906 : $P_{32234} = (9, 14, 30, 1)$
907 : $P_{32244} = (19, 14, 30, 1)$
908 : $P_{32329} = (8, 17, 30, 1)$
909 : $P_{32334} = (13, 17, 30, 1)$
910 : $P_{32420} = (3, 20, 30, 1)$
911 : $P_{32463} = (14, 21, 30, 1)$
912 : $P_{32464} = (15, 21, 30, 1)$
913 : $P_{32486} = (5, 22, 30, 1)$
914 : $P_{32488} = (7, 22, 30, 1)$
915 : $P_{32525} = (12, 23, 30, 1)$
916 : $P_{32528} = (15, 23, 30, 1)$
917 : $P_{32596} = (19, 25, 30, 1)$
918 : $P_{32607} = (30, 25, 30, 1)$
919 : $P_{32616} = (7, 26, 30, 1)$
920 : $P_{32618} = (9, 26, 30, 1)$
921 : $P_{32661} = (20, 27, 30, 1)$
922 : $P_{32668} = (27, 27, 30, 1)$
923 : $P_{32728} = (23, 29, 30, 1)$
924 : $P_{32735} = (30, 29, 30, 1)$
925 : $P_{32743} = (6, 30, 30, 1)$
926 : $P_{32749} = (12, 30, 30, 1)$
927 : $P_{32772} = (3, 31, 30, 1)$
928 : $P_{32777} = (8, 31, 30, 1)$
929 : $P_{32828} = (27, 0, 31, 1)$
930 : $P_{32877} = (12, 2, 31, 1)$
931 : $P_{32886} = (21, 2, 31, 1)$
932 : $P_{32935} = (6, 4, 31, 1)$
933 : $P_{32954} = (25, 4, 31, 1)$
934 : $P_{32973} = (12, 5, 31, 1)$
935 : $P_{32979} = (18, 5, 31, 1)$
936 : $P_{32995} = (2, 6, 31, 1)$
937 : $P_{33024} = (31, 6, 31, 1)$
938 : $P_{33091} = (2, 9, 31, 1)$
939 : $P_{33105} = (16, 9, 31, 1)$
940 : $P_{33134} = (13, 10, 31, 1)$
941 : $P_{33149} = (28, 10, 31, 1)$
942 : $P_{33193} = (8, 12, 31, 1)$
943 : $P_{33216} = (31, 12, 31, 1)$
944 : $P_{33318} = (5, 16, 31, 1)$
945 : $P_{33327} = (14, 16, 31, 1)$
946 : $P_{33461} = (20, 20, 31, 1)$
947 : $P_{33468} = (27, 20, 31, 1)$
948 : $P_{33479} = (6, 21, 31, 1)$
949 : $P_{33481} = (8, 21, 31, 1)$
950 : $P_{33582} = (13, 24, 31, 1)$
951 : $P_{33583} = (14, 24, 31, 1)$
952 : $P_{33661} = (28, 26, 31, 1)$
953 : $P_{33662} = (29, 26, 31, 1)$
954 : $P_{33670} = (5, 27, 31, 1)$
955 : $P_{33747} = (18, 29, 31, 1)$
956 : $P_{33749} = (20, 29, 31, 1)$
957 : $P_{33777} = (16, 30, 31, 1)$
958 : $P_{33782} = (21, 30, 31, 1)$
959 : $P_{33818} = (25, 31, 31, 1)$
960 : $P_{33822} = (29, 31, 31, 1)$

Line Intersection Graph

	0	1	2	3
0	0	1	0	1
1	1	0	1	1
2	0	1	0	0
3	1	1	0	0

Neighbor sets in the line intersection graph:
Line 0 intersects

Line	ℓ_1	ℓ_3
in point	P_1	P_5

Line 1 intersects

Line	ℓ_0	ℓ_2	ℓ_3
in point	P_1	P_{2082}	P_{2114}

Line 2 intersects

Line	ℓ_1
in point	P_{2082}

Line 3 intersects

Line	ℓ_0	ℓ_1
in point	P_5	P_{2114}

The surface has 1089 points:
Too many to print.