Rank-76100 over GF(32)

January 15, 2021

The equation

The equation of the surface is :

$$X_0^3 + X_0^2X_3 + X_1^2X_2 + X_1X_2^2 + X_0X_3^2 + X_0X_1X_2 = 0$$

(1, 0, 0, 0, 0, 0, 1, 0, 1, 0, 0, 1, 0, 1, 0, 0, 1, 0, 0, 0)
The point rank of the equation over GF(32) is -2112846810

General information

Number of lines	3
Number of points	1089
Number of singular points	0
Number of Eckardt points	1
Number of double points	0
Number of single points	96
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	$3, 1^{96}, 0^{992}$

Singular Points

The surface has 0 singular points:

The 3 Lines

The lines and their Pluecker coordinates are:

$$\ell_0 = \begin{bmatrix} 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{1082400} = \begin{bmatrix} 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{1082400} = \mathbf{Pl}(0,0,0,1,0,0)_{65}$$

$$\ell_1 = \begin{bmatrix} 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{1083424} = \begin{bmatrix} 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{1083424} = \mathbf{Pl}(0,1,0,0,0,0)_{1}$$

$$\ell_2 = \left[\begin{array}{cccc} 0 & 1 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{array}\right]_{1082433} = \left[\begin{array}{cccc} 0 & 1 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{array}\right]_{1082433} = \mathbf{Pl}(0,1,0,1,0,0)_{97}$$

Rank of lines: (1082400, 1083424, 1082433)
Rank of points on Klein quadric: (65, 1, 97)

Eckardt Points

The surface has 1 Eckardt points:
$0 : P_3 = \mathbf{P}(0,0,0,1) = \mathbf{P}(0,0,0,1)$.

Double Points

The surface has 0 Double points:
The double points on the surface are:

Single Points

The surface has 96 single points:
The single points on the surface are:

$0 : P_1 = (0,1,0,0)$ lies on line ℓ_0
$1 : P_2 = (0,0,1,0)$ lies on line ℓ_1
$2 : P_{67} = (0,1,1,0)$ lies on line ℓ_2
$3 : P_{1090} = (0,1,0,1)$ lies on line ℓ_0
$4 : P_{1122} = (0,2,0,1)$ lies on line ℓ_0
$5 : P_{1154} = (0,3,0,1)$ lies on line ℓ_0
$6 : P_{1186} = (0,4,0,1)$ lies on line ℓ_0
$7 : P_{1218} = (0,5,0,1)$ lies on line ℓ_0
$8 : P_{1250} = (0,6,0,1)$ lies on line ℓ_0
$9 : P_{1282} = (0,7,0,1)$ lies on line ℓ_0
$10 : P_{1314} = (0,8,0,1)$ lies on line ℓ_0
$11 : P_{1346} = (0,9,0,1)$ lies on line ℓ_0
$12 : P_{1378} = (0,10,0,1)$ lies on line ℓ_0
$13 : P_{1410} = (0,11,0,1)$ lies on line ℓ_0
$14 : P_{1442} = (0,12,0,1)$ lies on line ℓ_0
$15 : P_{1474} = (0,13,0,1)$ lies on line ℓ_0
$16 : P_{1506} = (0,14,0,1)$ lies on line ℓ_0
$17 : P_{1538} = (0,15,0,1)$ lies on line ℓ_0
$18 : P_{1570} = (0,16,0,1)$ lies on line ℓ_0
$19 : P_{1602} = (0,17,0,1)$ lies on line ℓ_0
$20 : P_{1634} = (0,18,0,1)$ lies on line ℓ_0
$21 : P_{1666} = (0,19,0,1)$ lies on line ℓ_0
$22 : P_{1698} = (0,20,0,1)$ lies on line ℓ_0
$23 : P_{1730} = (0,21,0,1)$ lies on line ℓ_0
$24 : P_{1762} = (0,22,0,1)$ lies on line ℓ_0
$25 : P_{1794} = (0,23,0,1)$ lies on line ℓ_0
$26 : P_{1826} = (0,24,0,1)$ lies on line ℓ_0
$27 : P_{1858} = (0,25,0,1)$ lies on line ℓ_0
$28 : P_{1890} = (0,26,0,1)$ lies on line ℓ_0
$29 : P_{1922} = (0,27,0,1)$ lies on line ℓ_0
$30 : P_{1954} = (0,28,0,1)$ lies on line ℓ_0
$31 : P_{1986} = (0,29,0,1)$ lies on line ℓ_0
$32 : P_{2018} = (0,30,0,1)$ lies on line ℓ_0
$33 : P_{2050} = (0,31,0,1)$ lies on line ℓ_0
$34 : P_{2082} = (0,0,1,1)$ lies on line ℓ_1
$35 : P_{2114} = (0,1,1,1)$ lies on line ℓ_2
$36 : P_{3105} = (0,0,2,1)$ lies on line ℓ_1
$37 : P_{3169} = (0,2,2,1)$ lies on line ℓ_2
$38 : P_{4129} = (0,0,3,1)$ lies on line ℓ_1
$39 : P_{4225} = (0,3,3,1)$ lies on line ℓ_2
$40 : P_{5153} = (0,0,4,1)$ lies on line ℓ_1
$41 : P_{5281} = (0,4,4,1)$ lies on line ℓ_2
$42 : P_{6177} = (0,0,5,1)$ lies on line ℓ_1
$43 : P_{6337} = (0,5,5,1)$ lies on line ℓ_2
$44 : P_{7201} = (0,0,6,1)$ lies on line ℓ_1
$45 : P_{7393} = (0,6,6,1)$ lies on line ℓ_2
$46 : P_{8225} = (0,0,7,1)$ lies on line ℓ_1
$47 : P_{8449} = (0,7,7,1)$ lies on line ℓ_2
$48 : P_{9249} = (0,0,8,1)$ lies on line ℓ_1
$49 : P_{9505} = (0,8,8,1)$ lies on line ℓ_2
$50 : P_{10273} = (0,0,9,1)$ lies on line ℓ_1
$51 : P_{10561} = (0,9,9,1)$ lies on line ℓ_2
$52 : P_{11297} = (0,0,10,1)$ lies on line ℓ_1
$53 : P_{11617} = (0,10,10,1)$ lies on line ℓ_2
$54 : P_{12321} = (0,0,11,1)$ lies on line ℓ_1
$55 : P_{12673} = (0,11,11,1)$ lies on line ℓ_2
$56 : P_{13345} = (0,0,12,1)$ lies on line ℓ_1
$57 : P_{13729} = (0,12,12,1)$ lies on line ℓ_2

58 : $P_{14369} = (0, 0, 13, 1)$ lies on line ℓ_1
59 : $P_{14785} = (0, 13, 13, 1)$ lies on line ℓ_2
60 : $P_{15393} = (0, 0, 14, 1)$ lies on line ℓ_1
61 : $P_{15841} = (0, 14, 14, 1)$ lies on line ℓ_2
62 : $P_{16417} = (0, 0, 15, 1)$ lies on line ℓ_1
63 : $P_{16897} = (0, 15, 15, 1)$ lies on line ℓ_2
64 : $P_{17441} = (0, 0, 16, 1)$ lies on line ℓ_1
65 : $P_{17953} = (0, 16, 16, 1)$ lies on line ℓ_2
66 : $P_{18465} = (0, 0, 17, 1)$ lies on line ℓ_1
67 : $P_{19009} = (0, 17, 17, 1)$ lies on line ℓ_2
68 : $P_{19489} = (0, 0, 18, 1)$ lies on line ℓ_1
69 : $P_{20065} = (0, 18, 18, 1)$ lies on line ℓ_2
70 : $P_{20513} = (0, 0, 19, 1)$ lies on line ℓ_1
71 : $P_{21121} = (0, 19, 19, 1)$ lies on line ℓ_2
72 : $P_{21537} = (0, 0, 20, 1)$ lies on line ℓ_1
73 : $P_{22177} = (0, 20, 20, 1)$ lies on line ℓ_2
74 : $P_{22561} = (0, 0, 21, 1)$ lies on line ℓ_1
75 : $P_{23233} = (0, 21, 21, 1)$ lies on line ℓ_2
76 : $P_{23585} = (0, 0, 22, 1)$ lies on line ℓ_1
77 : $P_{24289} = (0, 22, 22, 1)$ lies on line ℓ_2
78 : $P_{24609} = (0, 0, 23, 1)$ lies on line ℓ_1
79 : $P_{25345} = (0, 23, 23, 1)$ lies on line ℓ_2
80 : $P_{25633} = (0, 0, 24, 1)$ lies on line ℓ_1
81 : $P_{26401} = (0, 24, 24, 1)$ lies on line ℓ_2
82 : $P_{26657} = (0, 0, 25, 1)$ lies on line ℓ_1
83 : $P_{27457} = (0, 25, 25, 1)$ lies on line ℓ_2
84 : $P_{27681} = (0, 0, 26, 1)$ lies on line ℓ_1
85 : $P_{28513} = (0, 26, 26, 1)$ lies on line ℓ_2
86 : $P_{28705} = (0, 0, 27, 1)$ lies on line ℓ_1
87 : $P_{29569} = (0, 27, 27, 1)$ lies on line ℓ_2
88 : $P_{29729} = (0, 0, 28, 1)$ lies on line ℓ_1
89 : $P_{30625} = (0, 28, 28, 1)$ lies on line ℓ_2
90 : $P_{30753} = (0, 0, 29, 1)$ lies on line ℓ_1
91 : $P_{31681} = (0, 29, 29, 1)$ lies on line ℓ_2
92 : $P_{31777} = (0, 0, 30, 1)$ lies on line ℓ_1
93 : $P_{32737} = (0, 30, 30, 1)$ lies on line ℓ_2
94 : $P_{32801} = (0, 0, 31, 1)$ lies on line ℓ_1
95 : $P_{33793} = (0, 31, 31, 1)$ 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 : $P_4 = (1, 1, 1, 1)$
1 : $P_{68} = (1, 1, 1, 0)$
2 : $P_{130} = (31, 2, 1, 0)$
3 : $P_{135} = (4, 3, 1, 0)$
4 : $P_{181} = (18, 4, 1, 0)$
5 : $P_{211} = (16, 5, 1, 0)$
6 : $P_{231} = (4, 6, 1, 0)$
7 : $P_{270} = (11, 7, 1, 0)$
8 : $P_{297} = (6, 8, 1, 0)$
9 : $P_{345} = (22, 9, 1, 0)$
10 : $P_{375} = (20, 10, 1, 0)$
11 : $P_{412} = (25, 11, 1, 0)$
12 : $P_{446} = (27, 12, 1, 0)$
13 : $P_{462} = (11, 13, 1, 0)$
14 : $P_{512} = (29, 14, 1, 0)$
15 : $P_{521} = (6, 15, 1, 0)$
16 : $P_{556} = (9, 16, 1, 0)$
17 : $P_{592} = (13, 17, 1, 0)$
18 : $P_{640} = (29, 18, 1, 0)$
19 : $P_{668} = (25, 19, 1, 0)$
20 : $P_{691} = (16, 20, 1, 0)$
21 : $P_{722} = (15, 21, 1, 0)$
22 : $P_{766} = (27, 22, 1, 0)$
23 : $P_{789} = (18, 23, 1, 0)$
24 : $P_{812} = (9, 24, 1, 0)$
25 : $P_{837} = (2, 25, 1, 0)$
26 : $P_{869} = (2, 26, 1, 0)$
27 : $P_{914} = (15, 27, 1, 0)$
28 : $P_{962} = (31, 28, 1, 0)$
29 : $P_{976} = (13, 29, 1, 0)$
30 : $P_{1017} = (22, 30, 1, 0)$
31 : $P_{1047} = (20, 31, 1, 0)$
32 : $P_{2193} = (16, 3, 1, 1)$
33 : $P_{2254} = (13, 5, 1, 1)$
34 : $P_{2285} = (12, 6, 1, 1)$
35 : $P_{2292} = (19, 6, 1, 1)$
36 : $P_{2303} = (30, 6, 1, 1)$
37 : $P_{2325} = (20, 7, 1, 1)$
38 : $P_{2382} = (13, 9, 1, 1)$
39 : $P_{2386} = (17, 9, 1, 1)$
40 : $P_{2398} = (29, 9, 1, 1)$
41 : $P_{2445} = (12, 11, 1, 1)$
42 : $P_{2455} = (22, 11, 1, 1)$
43 : $P_{2460} = (27, 11, 1, 1)$
44 : $P_{2467} = (2, 12, 1, 1)$
45 : $P_{2563} = (2, 15, 1, 1)$
46 : $P_{2586} = (25, 15, 1, 1)$
47 : $P_{2587} = (26, 15, 1, 1)$

48 : $P_{2652} = (27, 17, 1, 1)$
49 : $P_{2662} = (5, 18, 1, 1)$
50 : $P_{2673} = (16, 18, 1, 1)$
51 : $P_{2677} = (20, 18, 1, 1)$
52 : $P_{2729} = (8, 20, 1, 1)$
53 : $P_{2740} = (19, 20, 1, 1)$
54 : $P_{2747} = (26, 20, 1, 1)$
55 : $P_{2782} = (29, 21, 1, 1)$
56 : $P_{2790} = (5, 22, 1, 1)$
57 : $P_{2795} = (10, 22, 1, 1)$
58 : $P_{2799} = (14, 22, 1, 1)$
59 : $P_{2842} = (25, 23, 1, 1)$
60 : $P_{2855} = (6, 24, 1, 1)$
61 : $P_{2895} = (14, 25, 1, 1)$
62 : $P_{2898} = (17, 25, 1, 1)$
63 : $P_{2911} = (30, 25, 1, 1)$
64 : $P_{2917} = (4, 26, 1, 1)$
65 : $P_{2999} = (22, 28, 1, 1)$
66 : $P_{3012} = (3, 29, 1, 1)$
67 : $P_{3017} = (8, 29, 1, 1)$
68 : $P_{3019} = (10, 29, 1, 1)$
69 : $P_{3076} = (3, 31, 1, 1)$
70 : $P_{3077} = (4, 31, 1, 1)$
71 : $P_{3079} = (6, 31, 1, 1)$
72 : $P_{3205} = (4, 3, 2, 1)$
73 : $P_{3218} = (17, 3, 2, 1)$
74 : $P_{3221} = (20, 3, 2, 1)$
75 : $P_{3258} = (25, 4, 2, 1)$
76 : $P_{3269} = (4, 5, 2, 1)$
77 : $P_{3362} = (1, 8, 2, 1)$
78 : $P_{3366} = (5, 8, 2, 1)$
79 : $P_{3458} = (1, 11, 2, 1)$
80 : $P_{3485} = (28, 11, 2, 1)$
81 : $P_{3492} = (3, 12, 2, 1)$
82 : $P_{3524} = (3, 13, 2, 1)$
83 : $P_{3590} = (5, 15, 2, 1)$
84 : $P_{3603} = (18, 15, 2, 1)$
85 : $P_{3607} = (22, 15, 2, 1)$
86 : $P_{3634} = (17, 16, 2, 1)$
87 : $P_{3660} = (11, 17, 2, 1)$
88 : $P_{3689} = (8, 18, 2, 1)$
89 : $P_{3760} = (15, 20, 2, 1)$
90 : $P_{3786} = (9, 21, 2, 1)$
91 : $P_{3797} = (20, 21, 2, 1)$
92 : $P_{3805} = (28, 21, 2, 1)$
93 : $P_{3851} = (10, 23, 2, 1)$
94 : $P_{3875} = (2, 24, 2, 1)$
95 : $P_{3881} = (8, 24, 2, 1)$
96 : $P_{3884} = (11, 24, 2, 1)$
97 : $P_{3920} = (15, 25, 2, 1)$
98 : $P_{3991} = (22, 27, 2, 1)$
99 : $P_{4074} = (9, 30, 2, 1)$
100 : $P_{4107} = (10, 31, 2, 1)$
101 : $P_{4115} = (18, 31, 2, 1)$
102 : $P_{4122} = (25, 31, 2, 1)$
103 : $P_{4177} = (16, 1, 3, 1)$
104 : $P_{4197} = (4, 2, 3, 1)$
105 : $P_{4210} = (17, 2, 3, 1)$
106 : $P_{4213} = (20, 2, 3, 1)$
107 : $P_{4235} = (10, 3, 3, 1)$
108 : $P_{4236} = (11, 3, 3, 1)$
109 : $P_{4293} = (4, 5, 3, 1)$
110 : $P_{4316} = (27, 5, 3, 1)$
111 : $P_{4319} = (30, 5, 3, 1)$
112 : $P_{4381} = (28, 7, 3, 1)$
113 : $P_{4423} = (6, 9, 3, 1)$
114 : $P_{4459} = (10, 10, 3, 1)$
115 : $P_{4492} = (11, 11, 3, 1)$
116 : $P_{4519} = (6, 12, 3, 1)$
117 : $P_{4563} = (18, 13, 3, 1)$
118 : $P_{4638} = (29, 15, 3, 1)$
119 : $P_{4658} = (17, 16, 3, 1)$
120 : $P_{4702} = (29, 17, 3, 1)$
121 : $P_{4721} = (16, 18, 3, 1)$
122 : $P_{4782} = (13, 20, 3, 1)$
123 : $P_{4821} = (20, 21, 3, 1)$
124 : $P_{4879} = (14, 23, 3, 1)$
125 : $P_{4900} = (3, 24, 3, 1)$
126 : $P_{4925} = (28, 24, 3, 1)$
127 : $P_{4927} = (30, 24, 3, 1)$
128 : $P_{4934} = (5, 25, 3, 1)$
129 : $P_{4963} = (2, 26, 3, 1)$
130 : $P_{4974} = (13, 26, 3, 1)$
131 : $P_{4975} = (14, 26, 3, 1)$
132 : $P_{4995} = (2, 27, 3, 1)$
133 : $P_{5043} = (18, 28, 3, 1)$
134 : $P_{5084} = (27, 29, 3, 1)$
135 : $P_{5126} = (5, 31, 3, 1)$
136 : $P_{5242} = (25, 2, 4, 1)$
137 : $P_{5325} = (12, 5, 4, 1)$
138 : $P_{5329} = (16, 5, 4, 1)$
139 : $P_{5342} = (29, 5, 4, 1)$
140 : $P_{5376} = (31, 6, 4, 1)$
141 : $P_{5381} = (4, 7, 4, 1)$
142 : $P_{5387} = (10, 7, 4, 1)$
143 : $P_{5392} = (15, 7, 4, 1)$
144 : $P_{5451} = (10, 9, 4, 1)$
145 : $P_{5474} = (1, 10, 4, 1)$
146 : $P_{5490} = (17, 10, 4, 1)$
147 : $P_{5552} = (15, 12, 4, 1)$
148 : $P_{5581} = (12, 13, 4, 1)$
149 : $P_{5634} = (1, 15, 4, 1)$
150 : $P_{5656} = (23, 15, 4, 1)$
151 : $P_{5671} = (6, 16, 4, 1)$
152 : $P_{5713} = (16, 17, 4, 1)$
153 : $P_{5735} = (6, 18, 4, 1)$
154 : $P_{5738} = (9, 18, 4, 1)$
155 : $P_{5743} = (14, 18, 4, 1)$

$156: P_{5772} = (11, 19, 4, 1)$
$157: P_{5935} = (14, 24, 4, 1)$
$158: P_{5990} = (5, 26, 4, 1)$
$159: P_{6022} = (5, 27, 4, 1)$
$160: P_{6060} = (11, 28, 4, 1)$
$161: P_{6072} = (23, 28, 4, 1)$
$162: P_{6078} = (29, 28, 4, 1)$
$163: P_{6112} = (31, 29, 4, 1)$
$164: P_{6154} = (9, 31, 4, 1)$
$165: P_{6162} = (17, 31, 4, 1)$
$166: P_{6170} = (25, 31, 4, 1)$
$167: P_{6222} = (13, 1, 5, 1)$
$168: P_{6245} = (4, 2, 5, 1)$
$169: P_{6277} = (4, 3, 5, 1)$
$170: P_{6300} = (27, 3, 5, 1)$
$171: P_{6303} = (30, 3, 5, 1)$
$172: P_{6317} = (12, 4, 5, 1)$
$173: P_{6321} = (16, 4, 5, 1)$
$174: P_{6334} = (29, 4, 5, 1)$
$175: P_{6351} = (14, 5, 5, 1)$
$176: P_{6352} = (15, 5, 5, 1)$
$177: P_{6386} = (17, 6, 5, 1)$
$178: P_{6406} = (5, 7, 5, 1)$
$179: P_{6420} = (19, 7, 5, 1)$
$180: P_{6424} = (23, 7, 5, 1)$
$181: P_{6478} = (13, 9, 5, 1)$
$182: P_{6549} = (20, 11, 5, 1)$
$183: P_{6583} = (22, 12, 5, 1)$
$184: P_{6605} = (12, 13, 5, 1)$
$185: P_{6639} = (14, 14, 5, 1)$
$186: P_{6672} = (15, 15, 5, 1)$
$187: P_{6723} = (2, 17, 5, 1)$
$188: P_{6737} = (16, 17, 5, 1)$
$189: P_{6740} = (19, 17, 5, 1)$
$190: P_{6770} = (17, 18, 5, 1)$
$191: P_{6872} = (23, 21, 5, 1)$
$192: P_{6883} = (2, 22, 5, 1)$
$193: P_{6922} = (9, 23, 5, 1)$
$194: P_{6975} = (30, 24, 5, 1)$
$195: P_{7029} = (20, 26, 5, 1)$
$196: P_{7050} = (9, 27, 5, 1)$
$197: P_{7102} = (29, 28, 5, 1)$
$198: P_{7132} = (27, 29, 5, 1)$
$199: P_{7191} = (22, 31, 5, 1)$
$200: P_{7245} = (12, 1, 6, 1)$
$201: P_{7252} = (19, 1, 6, 1)$
$202: P_{7263} = (30, 1, 6, 1)$
$203: P_{7360} = (31, 4, 6, 1)$
$204: P_{7378} = (17, 5, 6, 1)$
$205: P_{7439} = (14, 7, 6, 1)$
$206: P_{7512} = (23, 9, 6, 1)$
$207: P_{7565} = (12, 11, 6, 1)$
$208: P_{7601} = (16, 12, 6, 1)$
$209: P_{7675} = (26, 14, 6, 1)$
$210: P_{7695} = (14, 15, 6, 1)$
$211: P_{7787} = (10, 18, 6, 1)$
$212: P_{7794} = (17, 18, 6, 1)$
$213: P_{7803} = (26, 18, 6, 1)$
$214: P_{7860} = (19, 20, 6, 1)$
$215: P_{7886} = (13, 21, 6, 1)$
$216: P_{7916} = (11, 22, 6, 1)$
$217: P_{7992} = (23, 24, 6, 1)$
$218: P_{8031} = (30, 25, 6, 1)$
$219: P_{8049} = (16, 26, 6, 1)$
$220: P_{8076} = (11, 27, 6, 1)$
$221: P_{8160} = (31, 29, 6, 1)$
$222: P_{8167} = (6, 30, 6, 1)$
$223: P_{8171} = (10, 30, 6, 1)$
$224: P_{8174} = (13, 30, 6, 1)$
$225: P_{8277} = (20, 1, 7, 1)$
$226: P_{8349} = (28, 3, 7, 1)$
$227: P_{8357} = (4, 4, 7, 1)$
$228: P_{8363} = (10, 4, 7, 1)$
$229: P_{8368} = (15, 4, 7, 1)$
$230: P_{8390} = (5, 5, 7, 1)$
$231: P_{8404} = (19, 5, 7, 1)$
$232: P_{8408} = (23, 5, 7, 1)$
$233: P_{8431} = (14, 6, 7, 1)$
$234: P_{8453} = (4, 7, 7, 1)$
$235: P_{8454} = (5, 7, 7, 1)$
$236: P_{8523} = (10, 9, 7, 1)$
$237: P_{8534} = (21, 9, 7, 1)$
$238: P_{8543} = (30, 9, 7, 1)$
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645 : $P_{22043} = (26, 15, 20, 1)$
646 : $P_{22067} = (18, 16, 20, 1)$
647 : $P_{22093} = (12, 17, 20, 1)$
648 : $P_{22159} = (14, 19, 20, 1)$
649 : $P_{22165} = (20, 19, 20, 1)$
650 : $P_{22172} = (27, 19, 20, 1)$
651 : $P_{22239} = (30, 21, 20, 1)$
652 : $P_{22259} = (18, 22, 20, 1)$
653 : $P_{22352} = (15, 25, 20, 1)$
654 : $P_{22382} = (13, 26, 20, 1)$
655 : $P_{22460} = (27, 28, 20, 1)$
656 : $P_{22473} = (8, 29, 20, 1)$
657 : $P_{22500} = (3, 30, 20, 1)$
658 : $P_{22559} = (30, 31, 20, 1)$
659 : $P_{22622} = (29, 1, 21, 1)$
660 : $P_{22634} = (9, 2, 21, 1)$
661 : $P_{22645} = (20, 2, 21, 1)$
662 : $P_{22653} = (28, 2, 21, 1)$
663 : $P_{22677} = (20, 3, 21, 1)$
664 : $P_{22744} = (23, 5, 21, 1)$
665 : $P_{22766} = (13, 6, 21, 1)$
666 : $P_{22808} = (23, 7, 21, 1)$
667 : $P_{22878} = (29, 9, 21, 1)$
668 : $P_{22927} = (14, 11, 21, 1)$
669 : $P_{22932} = (19, 11, 21, 1)$
670 : $P_{22941} = (28, 11, 21, 1)$
671 : $P_{22953} = (8, 12, 21, 1)$
672 : $P_{22996} = (19, 13, 21, 1)$
673 : $P_{23014} = (5, 14, 21, 1)$
674 : $P_{23048} = (7, 15, 21, 1)$
675 : $P_{23087} = (14, 16, 21, 1)$
676 : $P_{23089} = (16, 16, 21, 1)$
677 : $P_{23104} = (31, 16, 21, 1)$
678 : $P_{23113} = (8, 17, 21, 1)$
679 : $P_{23122} = (17, 17, 21, 1)$
680 : $P_{23129} = (24, 17, 21, 1)$
681 : $P_{23190} = (21, 19, 21, 1)$
682 : $P_{23231} = (30, 20, 21, 1)$
683 : $P_{23249} = (16, 21, 21, 1)$
684 : $P_{23250} = (17, 21, 21, 1)$
685 : $P_{23424} = (31, 26, 21, 1)$
686 : $P_{23481} = (24, 28, 21, 1)$
687 : $P_{23496} = (7, 29, 21, 1)$
688 : $P_{23526} = (5, 30, 21, 1)$
689 : $P_{23530} = (9, 30, 21, 1)$
690 : $P_{23534} = (13, 30, 21, 1)$
691 : $P_{23583} = (30, 31, 21, 1)$
692 : $P_{23622} = (5, 1, 22, 1)$
693 : $P_{23627} = (10, 1, 22, 1)$
694 : $P_{23631} = (14, 1, 22, 1)$
695 : $P_{23747} = (2, 5, 22, 1)$

696 : $P_{23788} = (11, 6, 22, 1)$
697 : $P_{23858} = (17, 8, 22, 1)$
698 : $P_{23881} = (8, 9, 22, 1)$
699 : $P_{23909} = (4, 10, 22, 1)$
700 : $P_{23924} = (19, 10, 22, 1)$
701 : $P_{23927} = (22, 10, 22, 1)$
702 : $P_{24068} = (3, 15, 22, 1)$
703 : $P_{24082} = (17, 15, 22, 1)$
704 : $P_{24084} = (19, 15, 22, 1)$
705 : $P_{24115} = (18, 16, 22, 1)$
706 : $P_{24131} = (2, 17, 22, 1)$
707 : $P_{24166} = (5, 18, 22, 1)$
708 : $P_{24243} = (18, 20, 22, 1)$
709 : $P_{24329} = (8, 23, 22, 1)$
710 : $P_{24357} = (4, 24, 22, 1)$
711 : $P_{24399} = (14, 25, 22, 1)$
712 : $P_{24420} = (3, 26, 22, 1)$
713 : $P_{24460} = (11, 27, 22, 1)$
714 : $P_{24502} = (21, 28, 22, 1)$
715 : $P_{24523} = (10, 29, 22, 1)$
716 : $P_{24598} = (21, 31, 22, 1)$
717 : $P_{24666} = (25, 1, 23, 1)$
718 : $P_{24683} = (10, 2, 23, 1)$
719 : $P_{24719} = (14, 3, 23, 1)$
720 : $P_{24778} = (9, 5, 23, 1)$
721 : $P_{24867} = (2, 8, 23, 1)$
722 : $P_{24877} = (12, 8, 23, 1)$
723 : $P_{24880} = (15, 8, 23, 1)$
724 : $P_{24905} = (8, 9, 23, 1)$
725 : $P_{24952} = (23, 10, 23, 1)$
726 : $P_{25000} = (7, 12, 23, 1)$
727 : $P_{25114} = (25, 15, 23, 1)$
728 : $P_{25136} = (15, 16, 23, 1)$
729 : $P_{25143} = (22, 16, 23, 1)$
730 : $P_{25145} = (24, 16, 23, 1)$
731 : $P_{25175} = (22, 17, 23, 1)$
732 : $P_{25213} = (28, 18, 23, 1)$
733 : $P_{25229} = (12, 19, 23, 1)$
734 : $P_{25321} = (8, 22, 23, 1)$
735 : $P_{25371} = (26, 23, 23, 1)$
736 : $P_{25372} = (27, 23, 23, 1)$
737 : $P_{25398} = (21, 24, 23, 1)$
738 : $P_{25437} = (28, 25, 23, 1)$
739 : $P_{25455} = (14, 26, 23, 1)$
740 : $P_{25462} = (21, 26, 23, 1)$
741 : $P_{25467} = (26, 26, 23, 1)$
742 : $P_{25482} = (9, 27, 23, 1)$
743 : $P_{25492} = (19, 27, 23, 1)$
744 : $P_{25500} = (27, 27, 23, 1)$
745 : $P_{25512} = (7, 28, 23, 1)$
746 : $P_{25539} = (2, 29, 23, 1)$
747 : $P_{25611} = (10, 31, 23, 1)$
748 : $P_{25620} = (19, 31, 23, 1)$
749 : $P_{25625} = (24, 31, 23, 1)$
750 : $P_{25671} = (6, 1, 24, 1)$
751 : $P_{25699} = (2, 2, 24, 1)$
752 : $P_{25705} = (8, 2, 24, 1)$
753 : $P_{25708} = (11, 2, 24, 1)$
754 : $P_{25732} = (3, 3, 24, 1)$
755 : $P_{25757} = (28, 3, 24, 1)$
756 : $P_{25759} = (30, 3, 24, 1)$
757 : $P_{25775} = (14, 4, 24, 1)$
758 : $P_{25823} = (30, 5, 24, 1)$
759 : $P_{25848} = (23, 6, 24, 1)$
760 : $P_{25885} = (28, 7, 24, 1)$
761 : $P_{25915} = (26, 8, 24, 1)$
762 : $P_{25944} = (23, 9, 24, 1)$
763 : $P_{25957} = (4, 10, 24, 1)$
764 : $P_{25979} = (26, 10, 24, 1)$
765 : $P_{25984} = (31, 10, 24, 1)$
766 : $P_{25995} = (10, 11, 24, 1)$
767 : $P_{26042} = (25, 12, 24, 1)$
768 : $P_{26056} = (7, 13, 24, 1)$
769 : $P_{26074} = (25, 13, 24, 1)$
770 : $P_{26080} = (31, 13, 24, 1)$
771 : $P_{26105} = (24, 14, 24, 1)$
772 : $P_{26188} = (11, 17, 24, 1)$
773 : $P_{26216} = (7, 18, 24, 1)$
774 : $P_{26217} = (8, 18, 24, 1)$
775 : $P_{26223} = (14, 18, 24, 1)$
776 : $P_{26341} = (4, 22, 24, 1)$
777 : $P_{26390} = (21, 23, 24, 1)$
778 : $P_{26403} = (2, 24, 24, 1)$
779 : $P_{26404} = (3, 24, 24, 1)$
780 : $P_{26443} = (10, 25, 24, 1)$
781 : $P_{26486} = (21, 26, 24, 1)$
782 : $P_{26631} = (6, 31, 24, 1)$
783 : $P_{26703} = (14, 1, 25, 1)$
784 : $P_{26706} = (17, 1, 25, 1)$
785 : $P_{26719} = (30, 1, 25, 1)$
786 : $P_{26736} = (15, 2, 25, 1)$
787 : $P_{26758} = (5, 3, 25, 1)$
788 : $P_{26879} = (30, 6, 25, 1)$
789 : $P_{26897} = (16, 7, 25, 1)$
790 : $P_{26962} = (17, 9, 25, 1)$
791 : $P_{26989} = (12, 10, 25, 1)$
792 : $P_{27019} = (10, 11, 25, 1)$
793 : $P_{27045} = (4, 12, 25, 1)$
794 : $P_{27082} = (9, 13, 25, 1)$
795 : $P_{27113} = (8, 14, 25, 1)$
796 : $P_{27121} = (16, 14, 25, 1)$
797 : $P_{27130} = (25, 14, 25, 1)$
798 : $P_{27205} = (4, 17, 25, 1)$
799 : $P_{27261} = (28, 18, 25, 1)$
800 : $P_{27312} = (15, 20, 25, 1)$
801 : $P_{27375} = (14, 22, 25, 1)$
802 : $P_{27421} = (28, 23, 25, 1)$
803 : $P_{27435} = (10, 24, 25, 1)$

804 : $P_{27594} = (9, 29, 25, 1)$
805 : $P_{27654} = (5, 31, 25, 1)$
806 : $P_{27657} = (8, 31, 25, 1)$
807 : $P_{27661} = (12, 31, 25, 1)$
808 : $P_{27717} = (4, 1, 26, 1)$
809 : $P_{27779} = (2, 3, 26, 1)$
810 : $P_{27790} = (13, 3, 26, 1)$
811 : $P_{27791} = (14, 3, 26, 1)$
812 : $P_{27814} = (5, 4, 26, 1)$
813 : $P_{27861} = (20, 5, 26, 1)$
814 : $P_{27889} = (16, 6, 26, 1)$
815 : $P_{27911} = (6, 7, 26, 1)$
816 : $P_{27945} = (8, 8, 26, 1)$
817 : $P_{27978} = (9, 9, 26, 1)$
818 : $P_{28053} = (20, 11, 26, 1)$
819 : $P_{28075} = (10, 12, 26, 1)$
820 : $P_{28081} = (16, 12, 26, 1)$
821 : $P_{28092} = (27, 12, 26, 1)$
822 : $P_{28124} = (27, 13, 26, 1)$
823 : $P_{28164} = (3, 15, 26, 1)$
824 : $P_{28224} = (31, 16, 26, 1)$
825 : $P_{28250} = (25, 17, 26, 1)$
826 : $P_{28282} = (25, 18, 26, 1)$
827 : $P_{28334} = (13, 20, 26, 1)$
828 : $P_{28384} = (31, 21, 26, 1)$
829 : $P_{28388} = (3, 22, 26, 1)$
830 : $P_{28431} = (14, 23, 26, 1)$
831 : $P_{28438} = (21, 23, 26, 1)$
832 : $P_{28443} = (26, 23, 26, 1)$
833 : $P_{28470} = (21, 24, 26, 1)$
834 : $P_{28521} = (8, 26, 26, 1)$
835 : $P_{28522} = (9, 26, 26, 1)$
836 : $P_{28547} = (2, 27, 26, 1)$
837 : $P_{28550} = (5, 27, 26, 1)$
838 : $P_{28551} = (6, 27, 26, 1)$
839 : $P_{28587} = (10, 28, 26, 1)$
840 : $P_{28677} = (4, 31, 26, 1)$
841 : $P_{28791} = (22, 2, 27, 1)$
842 : $P_{28803} = (2, 3, 27, 1)$
843 : $P_{28838} = (5, 4, 27, 1)$
844 : $P_{28874} = (9, 5, 27, 1)$
845 : $P_{28908} = (11, 6, 27, 1)$
846 : $P_{28935} = (6, 7, 27, 1)$
847 : $P_{28947} = (18, 7, 27, 1)$
848 : $P_{28950} = (21, 7, 27, 1)$
849 : $P_{28994} = (1, 9, 27, 1)$
850 : $P_{29014} = (21, 9, 27, 1)$
851 : $P_{29060} = (3, 11, 27, 1)$
852 : $P_{29086} = (29, 11, 27, 1)$
853 : $P_{29088} = (31, 11, 27, 1)$
854 : $P_{29150} = (29, 13, 27, 1)$
855 : $P_{29171} = (18, 14, 27, 1)$
856 : $P_{29193} = (8, 15, 27, 1)$
857 : $P_{29207} = (22, 15, 27, 1)$
858 : $P_{29216} = (31, 15, 27, 1)$
859 : $P_{29243} = (26, 16, 27, 1)$
860 : $P_{29275} = (26, 17, 27, 1)$
861 : $P_{29314} = (1, 19, 27, 1)$
862 : $P_{29316} = (3, 19, 27, 1)$
863 : $P_{29420} = (11, 22, 27, 1)$
864 : $P_{29450} = (9, 23, 27, 1)$
865 : $P_{29460} = (19, 23, 27, 1)$
866 : $P_{29468} = (27, 23, 27, 1)$
867 : $P_{29539} = (2, 26, 27, 1)$
868 : $P_{29542} = (5, 26, 27, 1)$
869 : $P_{29543} = (6, 26, 27, 1)$
870 : $P_{29609} = (8, 28, 27, 1)$
871 : $P_{29716} = (19, 31, 27, 1)$
872 : $P_{29783} = (22, 1, 28, 1)$
873 : $P_{29843} = (18, 3, 28, 1)$
874 : $P_{29868} = (11, 4, 28, 1)$
875 : $P_{29880} = (23, 4, 28, 1)$
876 : $P_{29886} = (29, 4, 28, 1)$
877 : $P_{29918} = (29, 5, 28, 1)$
878 : $P_{30013} = (28, 8, 28, 1)$
879 : $P_{30103} = (22, 11, 28, 1)$
880 : $P_{30120} = (7, 12, 28, 1)$
881 : $P_{30123} = (10, 12, 28, 1)$
882 : $P_{30125} = (12, 12, 28, 1)$
883 : $P_{30158} = (13, 13, 28, 1)$
884 : $P_{30163} = (18, 13, 28, 1)$
885 : $P_{30175} = (30, 13, 28, 1)$
886 : $P_{30217} = (8, 15, 28, 1)$
887 : $P_{30232} = (23, 15, 28, 1)$
888 : $P_{30239} = (30, 15, 28, 1)$
889 : $P_{30297} = (24, 17, 28, 1)$
890 : $P_{30324} = (19, 18, 28, 1)$
891 : $P_{30348} = (11, 19, 28, 1)$
892 : $P_{30354} = (17, 19, 28, 1)$
893 : $P_{30364} = (27, 19, 28, 1)$
894 : $P_{30396} = (27, 20, 28, 1)$
895 : $P_{30425} = (24, 21, 28, 1)$
896 : $P_{30454} = (21, 22, 28, 1)$
897 : $P_{30472} = (7, 23, 28, 1)$
898 : $P_{30571} = (10, 26, 28, 1)$
899 : $P_{30601} = (8, 27, 28, 1)$
900 : $P_{30637} = (12, 28, 28, 1)$
901 : $P_{30638} = (13, 28, 28, 1)$
902 : $P_{30676} = (19, 29, 28, 1)$
903 : $P_{30706} = (17, 30, 28, 1)$
904 : $P_{30742} = (21, 31, 28, 1)$
905 : $P_{30788} = (3, 1, 29, 1)$
906 : $P_{30793} = (8, 1, 29, 1)$
907 : $P_{30795} = (10, 1, 29, 1)$
908 : $P_{30876} = (27, 3, 29, 1)$
909 : $P_{30912} = (31, 4, 29, 1)$
910 : $P_{30940} = (27, 5, 29, 1)$
911 : $P_{30976} = (31, 6, 29, 1)$

912 : $P_{31011} = (2, 8, 29, 1)$
913 : $P_{31038} = (29, 8, 29, 1)$
914 : $P_{31039} = (30, 8, 29, 1)$
915 : $P_{31110} = (5, 11, 29, 1)$
916 : $P_{31131} = (26, 11, 29, 1)$
917 : $P_{31135} = (30, 11, 29, 1)$
918 : $P_{31163} = (26, 12, 29, 1)$
919 : $P_{31178} = (9, 13, 29, 1)$
920 : $P_{31240} = (7, 15, 29, 1)$
921 : $P_{31348} = (19, 18, 29, 1)$
922 : $P_{31366} = (5, 19, 29, 1)$
923 : $P_{31401} = (8, 20, 29, 1)$
924 : $P_{31432} = (7, 21, 29, 1)$
925 : $P_{31467} = (10, 22, 29, 1)$
926 : $P_{31491} = (2, 23, 29, 1)$
927 : $P_{31562} = (9, 25, 29, 1)$
928 : $P_{31668} = (19, 28, 29, 1)$
929 : $P_{31748} = (3, 31, 29, 1)$
930 : $P_{31850} = (9, 2, 30, 1)$
931 : $P_{31975} = (6, 6, 30, 1)$
932 : $P_{31979} = (10, 6, 30, 1)$
933 : $P_{31982} = (13, 6, 30, 1)$
934 : $P_{32008} = (7, 7, 30, 1)$
935 : $P_{32068} = (3, 9, 30, 1)$
936 : $P_{32089} = (24, 9, 30, 1)$
937 : $P_{32091} = (26, 9, 30, 1)$
938 : $P_{32194} = (1, 13, 30, 1)$
939 : $P_{32219} = (26, 13, 30, 1)$
940 : $P_{32230} = (5, 14, 30, 1)$
941 : $P_{32281} = (24, 15, 30, 1)$
942 : $P_{32351} = (30, 17, 30, 1)$
943 : $P_{32354} = (1, 18, 30, 1)$
944 : $P_{32363} = (10, 18, 30, 1)$
945 : $P_{32402} = (17, 19, 30, 1)$
946 : $P_{32420} = (3, 20, 30, 1)$
947 : $P_{32454} = (5, 21, 30, 1)$
948 : $P_{32458} = (9, 21, 30, 1)$
949 : $P_{32462} = (13, 21, 30, 1)$
950 : $P_{32690} = (17, 28, 30, 1)$
951 : $P_{32743} = (6, 30, 30, 1)$
952 : $P_{32744} = (7, 30, 30, 1)$
953 : $P_{32836} = (3, 1, 31, 1)$
954 : $P_{32837} = (4, 1, 31, 1)$
955 : $P_{32839} = (6, 1, 31, 1)$
956 : $P_{32875} = (10, 2, 31, 1)$
957 : $P_{32883} = (18, 2, 31, 1)$
958 : $P_{32890} = (25, 2, 31, 1)$
959 : $P_{32902} = (5, 3, 31, 1)$
960 : $P_{32938} = (9, 4, 31, 1)$
961 : $P_{32946} = (17, 4, 31, 1)$
962 : $P_{32954} = (25, 4, 31, 1)$
963 : $P_{32983} = (22, 5, 31, 1)$
964 : $P_{33117} = (28, 9, 31, 1)$
965 : $P_{33133} = (12, 10, 31, 1)$
966 : $P_{33138} = (17, 10, 31, 1)$
967 : $P_{33149} = (28, 10, 31, 1)$
968 : $P_{33160} = (7, 11, 31, 1)$
969 : $P_{33207} = (22, 12, 31, 1)$
970 : $P_{33250} = (1, 14, 31, 1)$
971 : $P_{33257} = (8, 14, 31, 1)$
972 : $P_{33299} = (18, 15, 31, 1)$
973 : $P_{33314} = (1, 16, 31, 1)$
974 : $P_{33337} = (24, 16, 31, 1)$
975 : $P_{33376} = (31, 17, 31, 1)$
976 : $P_{33386} = (9, 18, 31, 1)$
977 : $P_{33416} = (7, 19, 31, 1)$
978 : $P_{33471} = (30, 20, 31, 1)$
979 : $P_{33503} = (30, 21, 31, 1)$
980 : $P_{33526} = (21, 22, 31, 1)$
981 : $P_{33547} = (10, 23, 31, 1)$
982 : $P_{33556} = (19, 23, 31, 1)$
983 : $P_{33561} = (24, 23, 31, 1)$
984 : $P_{33575} = (6, 24, 31, 1)$
985 : $P_{33606} = (5, 25, 31, 1)$
986 : $P_{33609} = (8, 25, 31, 1)$
987 : $P_{33613} = (12, 25, 31, 1)$
988 : $P_{33637} = (4, 26, 31, 1)$
989 : $P_{33684} = (19, 27, 31, 1)$
990 : $P_{33718} = (21, 28, 31, 1)$
991 : $P_{33732} = (3, 29, 31, 1)$

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_3	P_3

Line 1 intersects

Line	ℓ_0	ℓ_2
in point	P_3	P_3

Line 2 intersects

Line	ℓ_0	ℓ_1
in point	P_3	P_3

The surface has 1089 points:
Too many to print.