Rank-73802 over GF(32)

January 15, 2021

The equation

The equation of the surface is :

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

(1, 1, 1, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 1, 0, 0, 1, 0, 0, 0)
The point rank of the equation over GF(32) is -2112845754

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:

$$\ell_0 = \begin{bmatrix} 1 & 0 & 1 & 0 \\ 0 & 1 & 1 & 0 \end{bmatrix}_{1058} = \begin{bmatrix} 1 & 0 & 1 & 0 \\ 0 & 1 & 1 & 0 \end{bmatrix}_{1058} = \mathbf{Pl}(1,0,1,0,0,1)_{34913}$$

$$\ell_1 = \begin{bmatrix} 0 & 1 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{1082433} = \begin{bmatrix} 0 & 1 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{1082433} = \mathbf{Pl}(0,1,0,1,0,0)_{97}$$

$$\ell_2 = \begin{bmatrix} 1 & 0 & 1 & 1 \\ 0 & 1 & 1 & 0 \end{bmatrix}_{34882} = \begin{bmatrix} 1 & 0 & 1 & 1 \\ 0 & 1 & 1 & 0 \end{bmatrix}_{34882} = \mathbf{Pl}(1,1,1,1,0,1)_{38818}$$

Rank of lines: (1058, 1082433, 34882)
Rank of points on Klein quadric: (34913, 97, 38818)

Eckardt Points

The surface has 1 Eckardt points:
$0 : P_{67} = \mathbf{P}(0,1,1,0) = \mathbf{P}(0,1,1,0)$.

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:

$0 : P_3 = (0,0,0,1)$ lies on line ℓ_1
$1 : P_5 = (1,1,0,0)$ lies on line ℓ_0
$2 : P_{36} = (1,0,1,0)$ lies on line ℓ_0
$3 : P_{102} = (3,2,1,0)$ lies on line ℓ_0
$4 : P_{133} = (2,3,1,0)$ lies on line ℓ_0
$5 : P_{168} = (5,4,1,0)$ lies on line ℓ_0
$6 : P_{199} = (4,5,1,0)$ lies on line ℓ_0
$7 : P_{234} = (7,6,1,0)$ lies on line ℓ_0
$8 : P_{265} = (6,7,1,0)$ lies on line ℓ_0
$9 : P_{300} = (9,8,1,0)$ lies on line ℓ_0
$10 : P_{331} = (8,9,1,0)$ lies on line ℓ_0
$11 : P_{366} = (11,10,1,0)$ lies on line ℓ_0
$12 : P_{397} = (10,11,1,0)$ lies on line ℓ_0
$13 : P_{432} = (13,12,1,0)$ lies on line ℓ_0
$14 : P_{463} = (12,13,1,0)$ lies on line ℓ_0
$15 : P_{498} = (15,14,1,0)$ lies on line ℓ_0
$16 : P_{529} = (14,15,1,0)$ lies on line ℓ_0
$17 : P_{564} = (17,16,1,0)$ lies on line ℓ_0
$18 : P_{595} = (16,17,1,0)$ lies on line ℓ_0
$19 : P_{630} = (19,18,1,0)$ lies on line ℓ_0
$20 : P_{661} = (18,19,1,0)$ lies on line ℓ_0
$21 : P_{696} = (21,20,1,0)$ lies on line ℓ_0
$22 : P_{727} = (20,21,1,0)$ lies on line ℓ_0
$23 : P_{762} = (23,22,1,0)$ lies on line ℓ_0
$24 : P_{793} = (22,23,1,0)$ lies on line ℓ_0
$25 : P_{828} = (25,24,1,0)$ lies on line ℓ_0
$26 : P_{859} = (24,25,1,0)$ lies on line ℓ_0
$27 : P_{894} = (27,26,1,0)$ lies on line ℓ_0
$28 : P_{925} = (26,27,1,0)$ lies on line ℓ_0
$29 : P_{960} = (29,28,1,0)$ lies on line ℓ_0
$30 : P_{991} = (28,29,1,0)$ lies on line ℓ_0
$31 : P_{1026} = (31,30,1,0)$ lies on line ℓ_0
$32 : P_{1057} = (30,31,1,0)$ lies on line ℓ_0
$33 : P_{1091} = (1,1,0,1)$ lies on line ℓ_2
$34 : P_{2083} = (1,0,1,1)$ lies on line ℓ_2
$35 : P_{2114} = (0,1,1,1)$ lies on line ℓ_1
$36 : P_{3169} = (0,2,2,1)$ lies on line ℓ_1
$37 : P_{3202} = (1,3,2,1)$ lies on line ℓ_2
$38 : P_{4194} = (1,2,3,1)$ lies on line ℓ_2
$39 : P_{4225} = (0,3,3,1)$ lies on line ℓ_1
$40 : P_{5281} = (0,4,4,1)$ lies on line ℓ_1
$41 : P_{5314} = (1,5,4,1)$ lies on line ℓ_2
$42 : P_{6306} = (1,4,5,1)$ lies on line ℓ_2
$43 : P_{6337} = (0,5,5,1)$ lies on line ℓ_1
$44 : P_{7393} = (0,6,6,1)$ lies on line ℓ_1
$45 : P_{7426} = (1,7,6,1)$ lies on line ℓ_2
$46 : P_{8418} = (1,6,7,1)$ lies on line ℓ_2
$47 : P_{8449} = (0,7,7,1)$ lies on line ℓ_1
$48 : P_{9505} = (0,8,8,1)$ lies on line ℓ_1
$49 : P_{9538} = (1,9,8,1)$ lies on line ℓ_2
$50 : P_{10530} = (1,8,9,1)$ lies on line ℓ_2
$51 : P_{10561} = (0,9,9,1)$ lies on line ℓ_1
$52 : P_{11617} = (0,10,10,1)$ lies on line ℓ_1
$53 : P_{11650} = (1,11,10,1)$ lies on line ℓ_2
$54 : P_{12642} = (1,10,11,1)$ lies on line ℓ_2
$55 : P_{12673} = (0,11,11,1)$ lies on line ℓ_1
$56 : P_{13729} = (0,12,12,1)$ lies on line ℓ_1
$57 : P_{13762} = (1,13,12,1)$ lies on line ℓ_2

58 : $P_{14754} = (1, 12, 13, 1)$ lies on line ℓ_2
59 : $P_{14785} = (0, 13, 13, 1)$ lies on line ℓ_1
60 : $P_{15841} = (0, 14, 14, 1)$ lies on line ℓ_1
61 : $P_{15874} = (1, 15, 14, 1)$ lies on line ℓ_2
62 : $P_{16866} = (1, 14, 15, 1)$ lies on line ℓ_2
63 : $P_{16897} = (0, 15, 15, 1)$ lies on line ℓ_1
64 : $P_{17953} = (0, 16, 16, 1)$ lies on line ℓ_1
65 : $P_{17986} = (1, 17, 16, 1)$ lies on line ℓ_2
66 : $P_{18978} = (1, 16, 17, 1)$ lies on line ℓ_2
67 : $P_{19009} = (0, 17, 17, 1)$ lies on line ℓ_1
68 : $P_{20065} = (0, 18, 18, 1)$ lies on line ℓ_1
69 : $P_{20098} = (1, 19, 18, 1)$ lies on line ℓ_2
70 : $P_{21090} = (1, 18, 19, 1)$ lies on line ℓ_2
71 : $P_{21121} = (0, 19, 19, 1)$ lies on line ℓ_1
72 : $P_{22177} = (0, 20, 20, 1)$ lies on line ℓ_1
73 : $P_{22210} = (1, 21, 20, 1)$ lies on line ℓ_2
74 : $P_{23202} = (1, 20, 21, 1)$ lies on line ℓ_2
75 : $P_{23233} = (0, 21, 21, 1)$ lies on line ℓ_1
76 : $P_{24289} = (0, 22, 22, 1)$ lies on line ℓ_1
77 : $P_{24322} = (1, 23, 22, 1)$ lies on line ℓ_2
78 : $P_{25314} = (1, 22, 23, 1)$ lies on line ℓ_2
79 : $P_{25345} = (0, 23, 23, 1)$ lies on line ℓ_1
80 : $P_{26401} = (0, 24, 24, 1)$ lies on line ℓ_1
81 : $P_{26434} = (1, 25, 24, 1)$ lies on line ℓ_2
82 : $P_{27426} = (1, 24, 25, 1)$ lies on line ℓ_2
83 : $P_{27457} = (0, 25, 25, 1)$ lies on line ℓ_1
84 : $P_{28513} = (0, 26, 26, 1)$ lies on line ℓ_1
85 : $P_{28546} = (1, 27, 26, 1)$ lies on line ℓ_2
86 : $P_{29538} = (1, 26, 27, 1)$ lies on line ℓ_2
87 : $P_{29569} = (0, 27, 27, 1)$ lies on line ℓ_1
88 : $P_{30625} = (0, 28, 28, 1)$ lies on line ℓ_1
89 : $P_{30658} = (1, 29, 28, 1)$ lies on line ℓ_2
90 : $P_{31650} = (1, 28, 29, 1)$ lies on line ℓ_2
91 : $P_{31681} = (0, 29, 29, 1)$ lies on line ℓ_1
92 : $P_{32737} = (0, 30, 30, 1)$ lies on line ℓ_1
93 : $P_{32770} = (1, 31, 30, 1)$ lies on line ℓ_2
94 : $P_{33762} = (1, 30, 31, 1)$ lies on line ℓ_2
95 : $P_{33793} = (0, 31, 31, 1)$ lies on line ℓ_1

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 : $P_{1135} = (13, 2, 0, 1)$
3 : $P_{1171} = (17, 3, 0, 1)$
4 : $P_{1213} = (27, 4, 0, 1)$
5 : $P_{1230} = (12, 5, 0, 1)$
6 : $P_{1269} = (19, 6, 0, 1)$
7 : $P_{1297} = (15, 7, 0, 1)$
8 : $P_{1336} = (22, 8, 0, 1)$
9 : $P_{1367} = (21, 9, 0, 1)$
10 : $P_{1403} = (25, 10, 0, 1)$
11 : $P_{1438} = (28, 11, 0, 1)$
12 : $P_{1445} = (3, 12, 0, 1)$
13 : $P_{1478} = (4, 13, 0, 1)$
14 : $P_{1512} = (6, 14, 0, 1)$
15 : $P_{1561} = (23, 15, 0, 1)$
16 : $P_{1572} = (2, 16, 0, 1)$
17 : $P_{1628} = (26, 17, 0, 1)$
18 : $P_{1641} = (7, 18, 0, 1)$
19 : $P_{1695} = (29, 19, 0, 1)$
20 : $P_{1706} = (8, 20, 0, 1)$
21 : $P_{1761} = (31, 21, 0, 1)$
22 : $P_{1776} = (14, 22, 0, 1)$
23 : $P_{1803} = (9, 23, 0, 1)$
24 : $P_{1837} = (11, 24, 0, 1)$
25 : $P_{1888} = (30, 25, 0, 1)$
26 : $P_{1895} = (5, 26, 0, 1)$
27 : $P_{1938} = (16, 27, 0, 1)$
28 : $P_{1972} = (18, 28, 0, 1)$
29 : $P_{1996} = (10, 29, 0, 1)$
30 : $P_{2038} = (20, 30, 0, 1)$
31 : $P_{2074} = (24, 31, 0, 1)$
32 : $P_{2151} = (6, 2, 1, 1)$
33 : $P_{2154} = (9, 2, 1, 1)$
34 : $P_{2159} = (14, 2, 1, 1)$
35 : $P_{2206} = (29, 3, 1, 1)$
36 : $P_{2220} = (11, 4, 1, 1)$
37 : $P_{2229} = (20, 4, 1, 1)$
38 : $P_{2239} = (30, 4, 1, 1)$
39 : $P_{2263} = (22, 5, 1, 1)$
40 : $P_{2313} = (8, 7, 1, 1)$
41 : $P_{2341} = (4, 8, 1, 1)$
42 : $P_{2356} = (19, 8, 1, 1)$
43 : $P_{2359} = (22, 8, 1, 1)$
44 : $P_{2409} = (8, 10, 1, 1)$
45 : $P_{2417} = (16, 10, 1, 1)$
46 : $P_{2426} = (25, 10, 1, 1)$
47 : $P_{2471} = (6, 12, 1, 1)$

48 : $P_{2505} = (8, 13, 1, 1)$
49 : $P_{2519} = (22, 13, 1, 1)$
50 : $P_{2528} = (31, 13, 1, 1)$
51 : $P_{2535} = (6, 14, 1, 1)$
52 : $P_{2539} = (10, 14, 1, 1)$
53 : $P_{2542} = (13, 14, 1, 1)$
54 : $P_{2608} = (15, 16, 1, 1)$
55 : $P_{2612} = (19, 16, 1, 1)$
56 : $P_{2622} = (29, 16, 1, 1)$
57 : $P_{2650} = (25, 17, 1, 1)$
58 : $P_{2691} = (2, 19, 1, 1)$
59 : $P_{2718} = (29, 19, 1, 1)$
60 : $P_{2719} = (30, 19, 1, 1)$
61 : $P_{2763} = (10, 21, 1, 1)$
62 : $P_{2847} = (30, 23, 1, 1)$
63 : $P_{2868} = (19, 24, 1, 1)$
64 : $P_{2933} = (20, 26, 1, 1)$
65 : $P_{2955} = (10, 27, 1, 1)$
66 : $P_{2963} = (18, 27, 1, 1)$
67 : $P_{2970} = (25, 27, 1, 1)$
68 : $P_{2991} = (14, 28, 1, 1)$
69 : $P_{3055} = (14, 30, 1, 1)$
70 : $P_{3061} = (20, 30, 1, 1)$
71 : $P_{3068} = (27, 30, 1, 1)$
72 : $P_{3118} = (13, 0, 2, 1)$
73 : $P_{3143} = (6, 1, 2, 1)$
74 : $P_{3146} = (9, 1, 2, 1)$
75 : $P_{3151} = (14, 1, 2, 1)$
76 : $P_{3225} = (24, 3, 2, 1)$
77 : $P_{3268} = (3, 5, 2, 1)$
78 : $P_{3378} = (17, 8, 2, 1)$
79 : $P_{3408} = (15, 9, 2, 1)$
80 : $P_{3415} = (22, 9, 2, 1)$
81 : $P_{3417} = (24, 9, 2, 1)$
82 : $P_{3449} = (24, 10, 2, 1)$
83 : $P_{3502} = (13, 12, 2, 1)$
84 : $P_{3507} = (18, 12, 2, 1)$
85 : $P_{3519} = (30, 12, 2, 1)$
86 : $P_{3526} = (5, 13, 2, 1)$
87 : $P_{3529} = (8, 13, 2, 1)$
88 : $P_{3533} = (12, 13, 2, 1)$
89 : $P_{3620} = (3, 16, 2, 1)$
90 : $P_{3629} = (12, 16, 2, 1)$
91 : $P_{3631} = (14, 16, 2, 1)$
92 : $P_{3663} = (14, 17, 2, 1)$
93 : $P_{3698} = (17, 18, 2, 1)$
94 : $P_{3718} = (5, 19, 2, 1)$
95 : $P_{3752} = (7, 20, 2, 1)$
96 : $P_{3780} = (3, 21, 2, 1)$
97 : $P_{3793} = (16, 21, 2, 1)$
98 : $P_{3795} = (18, 21, 2, 1)$
99 : $P_{3923} = (18, 25, 2, 1)$
100 : $P_{3954} = (17, 26, 2, 1)$
101 : $P_{4005} = (4, 28, 2, 1)$
102 : $P_{4045} = (12, 29, 2, 1)$
103 : $P_{4067} = (2, 30, 2, 1)$
104 : $P_{4070} = (5, 30, 2, 1)$
105 : $P_{4071} = (6, 30, 2, 1)$
106 : $P_{4103} = (6, 31, 2, 1)$
107 : $P_{4146} = (17, 0, 3, 1)$
108 : $P_{4190} = (29, 1, 3, 1)$
109 : $P_{4217} = (24, 2, 3, 1)$
110 : $P_{4235} = (10, 3, 3, 1)$
111 : $P_{4236} = (11, 3, 3, 1)$
112 : $P_{4269} = (12, 4, 3, 1)$
113 : $P_{4291} = (2, 5, 3, 1)$
114 : $P_{4314} = (25, 5, 3, 1)$
115 : $P_{4315} = (26, 5, 3, 1)$
116 : $P_{4340} = (19, 6, 3, 1)$
117 : $P_{4416} = (31, 8, 3, 1)$
118 : $P_{4430} = (13, 9, 3, 1)$
119 : $P_{4477} = (28, 10, 3, 1)$
120 : $P_{4501} = (20, 11, 3, 1)$
121 : $P_{4553} = (8, 13, 3, 1)$
122 : $P_{4630} = (21, 15, 3, 1)$
123 : $P_{4643} = (2, 16, 3, 1)$
124 : $P_{4649} = (8, 16, 3, 1)$
125 : $P_{4652} = (11, 16, 3, 1)$
126 : $P_{4708} = (3, 18, 3, 1)$
127 : $P_{4748} = (11, 19, 3, 1)$
128 : $P_{4784} = (15, 20, 3, 1)$
129 : $P_{4803} = (2, 21, 3, 1)$
130 : $P_{4973} = (12, 26, 3, 1)$
131 : $P_{4983} = (22, 26, 3, 1)$
132 : $P_{4988} = (27, 26, 3, 1)$
133 : $P_{5019} = (26, 27, 3, 1)$
134 : $P_{5055} = (30, 28, 3, 1)$
135 : $P_{5065} = (8, 29, 3, 1)$
136 : $P_{5074} = (17, 29, 3, 1)$
137 : $P_{5081} = (24, 29, 3, 1)$
138 : $P_{5101} = (12, 30, 3, 1)$
139 : $P_{5112} = (23, 30, 3, 1)$
140 : $P_{5115} = (26, 30, 3, 1)$
141 : $P_{5145} = (24, 31, 3, 1)$
142 : $P_{5180} = (27, 0, 4, 1)$
143 : $P_{5196} = (11, 1, 4, 1)$
144 : $P_{5205} = (20, 1, 4, 1)$
145 : $P_{5215} = (30, 1, 4, 1)$
146 : $P_{5261} = (12, 3, 4, 1)$
147 : $P_{5320} = (7, 5, 4, 1)$
148 : $P_{5354} = (9, 6, 4, 1)$
149 : $P_{5426} = (17, 8, 4, 1)$
150 : $P_{5453} = (12, 9, 4, 1)$
151 : $P_{5485} = (12, 10, 4, 1)$
152 : $P_{5512} = (7, 11, 4, 1)$
153 : $P_{5530} = (25, 11, 4, 1)$
154 : $P_{5536} = (31, 11, 4, 1)$
155 : $P_{5567} = (30, 12, 4, 1)$

$156: P_{5574} = (5, 13, 4, 1)$
$157: P_{5595} = (26, 13, 4, 1)$
$158: P_{5599} = (30, 13, 4, 1)$
$159: P_{5608} = (7, 14, 4, 1)$
$160: P_{5702} = (5, 17, 4, 1)$
$161: P_{5749} = (20, 18, 4, 1)$
$162: P_{5765} = (4, 19, 4, 1)$
$163: P_{5778} = (17, 19, 4, 1)$
$164: P_{5781} = (20, 19, 4, 1)$
$165: P_{5883} = (26, 22, 4, 1)$
$166: P_{5905} = (16, 23, 4, 1)$
$167: P_{5994} = (9, 26, 4, 1)$
$168: P_{6004} = (19, 26, 4, 1)$
$169: P_{6012} = (27, 26, 4, 1)$
$170: P_{6027} = (10, 27, 4, 1)$
$171: P_{6034} = (17, 27, 4, 1)$
$172: P_{6043} = (26, 27, 4, 1)$
$173: P_{6054} = (5, 28, 4, 1)$
$174: P_{6058} = (9, 28, 4, 1)$
$175: P_{6062} = (13, 28, 4, 1)$
$176: P_{6102} = (21, 29, 4, 1)$
$177: P_{6189} = (12, 0, 5, 1)$
$178: P_{6231} = (22, 1, 5, 1)$
$179: P_{6244} = (3, 2, 5, 1)$
$180: P_{6275} = (2, 3, 5, 1)$
$181: P_{6298} = (25, 3, 5, 1)$
$182: P_{6299} = (26, 3, 5, 1)$
$183: P_{6312} = (7, 4, 5, 1)$
$184: P_{6351} = (14, 5, 5, 1)$
$185: P_{6352} = (15, 5, 5, 1)$
$186: P_{6448} = (15, 8, 5, 1)$
$187: P_{6470} = (5, 9, 5, 1)$
$188: P_{6515} = (18, 10, 5, 1)$
$189: P_{6556} = (27, 11, 5, 1)$
$190: P_{6597} = (4, 13, 5, 1)$
$191: P_{6603} = (10, 13, 5, 1)$
$192: P_{6608} = (15, 13, 5, 1)$
$193: P_{6648} = (23, 14, 5, 1)$
$194: P_{6686} = (29, 15, 5, 1)$
$195: P_{6715} = (26, 16, 5, 1)$
$196: P_{6724} = (3, 17, 5, 1)$
$197: P_{6725} = (4, 17, 5, 1)$
$198: P_{6727} = (6, 17, 5, 1)$
$199: P_{6760} = (7, 18, 5, 1)$
$200: P_{6788} = (3, 19, 5, 1)$
$201: P_{6809} = (24, 19, 5, 1)$
$202: P_{6811} = (26, 19, 5, 1)$
$203: P_{6825} = (8, 20, 5, 1)$
$204: P_{6888} = (7, 22, 5, 1)$
$205: P_{6891} = (10, 22, 5, 1)$
$206: P_{6893} = (12, 22, 5, 1)$
$207: P_{6932} = (19, 23, 5, 1)$
$208: P_{7051} = (10, 27, 5, 1)$
$209: P_{7077} = (4, 28, 5, 1)$
$210: P_{7136} = (31, 29, 5, 1)$
$211: P_{7197} = (28, 31, 5, 1)$
$212: P_{7220} = (19, 0, 6, 1)$
$213: P_{7316} = (19, 3, 6, 1)$
$214: P_{7338} = (9, 4, 6, 1)$
$215: P_{7455} = (30, 7, 6, 1)$
$216: P_{7474} = (17, 8, 6, 1)$
$217: P_{7516} = (27, 9, 6, 1)$
$218: P_{7530} = (9, 10, 6, 1)$
$219: P_{7583} = (30, 11, 6, 1)$
$220: P_{7588} = (3, 12, 6, 1)$
$221: P_{7613} = (28, 12, 6, 1)$
$222: P_{7615} = (30, 12, 6, 1)$
$223: P_{7622} = (5, 13, 6, 1)$
$224: P_{7658} = (9, 14, 6, 1)$
$225: P_{7688} = (7, 15, 6, 1)$
$226: P_{7815} = (6, 19, 6, 1)$
$227: P_{7866} = (25, 20, 6, 1)$
$228: P_{8023} = (22, 25, 6, 1)$
$229: P_{8044} = (11, 26, 6, 1)$
$230: P_{8089} = (24, 27, 6, 1)$
$231: P_{8112} = (15, 28, 6, 1)$
$232: P_{8207} = (14, 31, 6, 1)$
$233: P_{8240} = (15, 0, 7, 1)$
$234: P_{8265} = (8, 1, 7, 1)$
$235: P_{8447} = (30, 6, 7, 1)$
$236: P_{8453} = (4, 7, 7, 1)$
$237: P_{8454} = (5, 7, 7, 1)$
$238: P_{8567} = (22, 10, 7, 1)$
$239: P_{8619} = (10, 12, 7, 1)$
$240: P_{8668} = (27, 13, 7, 1)$
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647 : $P_{20661} = (20, 4, 19, 1)$
648 : $P_{20676} = (3, 5, 19, 1)$
649 : $P_{20697} = (24, 5, 19, 1)$
650 : $P_{20699} = (26, 5, 19, 1)$
651 : $P_{20711} = (6, 6, 19, 1)$
652 : $P_{20752} = (15, 7, 19, 1)$
653 : $P_{20771} = (2, 8, 19, 1)$
654 : $P_{20803} = (2, 9, 19, 1)$
655 : $P_{20817} = (16, 9, 19, 1)$
656 : $P_{20820} = (19, 9, 19, 1)$
657 : $P_{20841} = (8, 10, 19, 1)$
658 : $P_{20904} = (7, 12, 19, 1)$
659 : $P_{20957} = (28, 13, 19, 1)$
660 : $P_{20991} = (30, 14, 19, 1)$
661 : $P_{21003} = (10, 15, 19, 1)$
662 : $P_{21014} = (21, 15, 19, 1)$
663 : $P_{21023} = (30, 15, 19, 1)$
664 : $P_{21101} = (12, 18, 19, 1)$
665 : $P_{21141} = (20, 19, 19, 1)$
666 : $P_{21142} = (21, 19, 19, 1)$
667 : $P_{21208} = (23, 21, 19, 1)$
668 : $P_{21248} = (31, 22, 19, 1)$
669 : $P_{21269} = (20, 23, 19, 1)$
670 : $P_{21318} = (5, 25, 19, 1)$
671 : $P_{21360} = (15, 26, 19, 1)$
672 : $P_{21382} = (5, 27, 19, 1)$
673 : $P_{21430} = (21, 28, 19, 1)$
674 : $P_{21456} = (15, 29, 19, 1)$
675 : $P_{21500} = (27, 30, 19, 1)$
676 : $P_{21545} = (8, 0, 20, 1)$
677 : $P_{21608} = (7, 2, 20, 1)$
678 : $P_{21648} = (15, 3, 20, 1)$
679 : $P_{21705} = (8, 5, 20, 1)$
680 : $P_{21754} = (25, 6, 20, 1)$
681 : $P_{21813} = (20, 8, 20, 1)$
682 : $P_{21869} = (12, 10, 20, 1)$
683 : $P_{21891} = (2, 11, 20, 1)$
684 : $P_{21996} = (11, 14, 20, 1)$
685 : $P_{22036} = (19, 15, 20, 1)$
686 : $P_{22060} = (11, 16, 20, 1)$
687 : $P_{22143} = (30, 18, 20, 1)$
688 : $P_{22228} = (19, 21, 20, 1)$
689 : $P_{22304} = (31, 23, 20, 1)$
690 : $P_{22374} = (5, 26, 20, 1)$
691 : $P_{22388} = (19, 26, 20, 1)$
692 : $P_{22392} = (23, 26, 20, 1)$
693 : $P_{22418} = (17, 27, 20, 1)$
694 : $P_{22471} = (6, 29, 20, 1)$
695 : $P_{22508} = (11, 30, 20, 1)$

$696: P_{22550} = (21, 31, 20, 1)$
$697: P_{22592} = (31, 0, 21, 1)$
$698: P_{22603} = (10, 1, 21, 1)$
$699: P_{22628} = (3, 2, 21, 1)$
$700: P_{22641} = (16, 2, 21, 1)$
$701: P_{22643} = (18, 2, 21, 1)$
$702: P_{22659} = (2, 3, 21, 1)$
$703: P_{22848} = (31, 8, 21, 1)$
$704: P_{22871} = (22, 9, 21, 1)$
$705: P_{23034} = (25, 14, 21, 1)$
$706: P_{23145} = (8, 18, 21, 1)$
$707: P_{23192} = (23, 19, 21, 1)$
$708: P_{23220} = (19, 20, 21, 1)$
$709: P_{23249} = (16, 21, 21, 1)$
$710: P_{23250} = (17, 21, 21, 1)$
$711: P_{23313} = (16, 23, 21, 1)$
$712: P_{23331} = (2, 24, 21, 1)$
$713: P_{23372} = (11, 25, 21, 1)$
$714: P_{23407} = (14, 26, 21, 1)$
$715: P_{23427} = (2, 27, 21, 1)$
$716: P_{23528} = (7, 30, 21, 1)$
$717: P_{23568} = (15, 31, 21, 1)$
$718: P_{23573} = (20, 31, 21, 1)$
$719: P_{23579} = (26, 31, 21, 1)$
$720: P_{23599} = (14, 0, 22, 1)$
$721: P_{23739} = (26, 4, 22, 1)$
$722: P_{23752} = (7, 5, 22, 1)$
$723: P_{23755} = (10, 5, 22, 1)$
$724: P_{23757} = (12, 5, 22, 1)$
$725: P_{23818} = (9, 7, 22, 1)$
$726: P_{23872} = (31, 8, 22, 1)$
$727: P_{23896} = (23, 9, 22, 1)$
$728: P_{23945} = (8, 11, 22, 1)$
$729: P_{23983} = (14, 12, 22, 1)$
$730: P_{24055} = (22, 14, 22, 1)$
$731: P_{24125} = (28, 16, 22, 1)$
$732: P_{24147} = (18, 17, 22, 1)$
$733: P_{24171} = (10, 18, 22, 1)$
$734: P_{24224} = (31, 19, 22, 1)$
$735: P_{24331} = (10, 23, 22, 1)$
$736: P_{24414} = (29, 25, 22, 1)$
$737: P_{24480} = (31, 27, 22, 1)$
$738: P_{24533} = (20, 29, 22, 1)$
$739: P_{24548} = (3, 30, 22, 1)$
$740: P_{24593} = (16, 31, 22, 1)$
$741: P_{24618} = (9, 0, 23, 1)$
$742: P_{24671} = (30, 1, 23, 1)$
$743: P_{24753} = (16, 4, 23, 1)$
$744: P_{24788} = (19, 5, 23, 1)$
$745: P_{24860} = (27, 7, 23, 1)$
$746: P_{24893} = (28, 8, 23, 1)$
$747: P_{24902} = (5, 9, 23, 1)$
$748: P_{24915} = (18, 9, 23, 1)$
$749: P_{24919} = (22, 9, 23, 1)$
$750: P_{24936} = (7, 10, 23, 1)$
$751: P_{24975} = (14, 11, 23, 1)$
$752: P_{25066} = (9, 14, 23, 1)$
$753: P_{25095} = (6, 15, 23, 1)$
$754: P_{25132} = (11, 16, 23, 1)$
$755: P_{25138} = (17, 16, 23, 1)$
$756: P_{25148} = (27, 16, 23, 1)$
$757: P_{25169} = (16, 17, 23, 1)$
$758: P_{25237} = (20, 19, 23, 1)$
$759: P_{25280} = (31, 20, 23, 1)$
$760: P_{25297} = (16, 21, 23, 1)$
$761: P_{25323} = (10, 22, 23, 1)$
$762: P_{25371} = (26, 23, 23, 1)$
$763: P_{25372} = (27, 23, 23, 1)$
$764: P_{25644} = (11, 0, 24, 1)$
$765: P_{25684} = (19, 1, 24, 1)$
$766: P_{25918} = (29, 8, 24, 1)$
$767: P_{25976} = (23, 10, 24, 1)$
$768: P_{25994} = (9, 11, 24, 1)$
$769: P_{26002} = (17, 11, 24, 1)$
$770: P_{26010} = (25, 11, 24, 1)$
$771: P_{26030} = (13, 12, 24, 1)$
$772: P_{26051} = (2, 13, 24, 1)$
$773: P_{26061} = (12, 13, 24, 1)$
$774: P_{26064} = (15, 13, 24, 1)$
$775: P_{26102} = (21, 14, 24, 1)$
$776: P_{26143} = (30, 15, 24, 1)$
$777: P_{26158} = (13, 16, 24, 1)$
$778: P_{26185} = (8, 17, 24, 1)$
$779: P_{26307} = (2, 21, 24, 1)$
$780: P_{26403} = (2, 24, 24, 1)$
$781: P_{26404} = (3, 24, 24, 1)$
$782: P_{26447} = (14, 25, 24, 1)$
$783: P_{26542} = (13, 28, 24, 1)$
$784: P_{26579} = (18, 29, 24, 1)$
$785: P_{26604} = (11, 30, 24, 1)$
$786: P_{26645} = (20, 31, 24, 1)$
$787: P_{26687} = (30, 0, 25, 1)$
$788: P_{26739} = (18, 2, 25, 1)$
$789: P_{26871} = (22, 6, 25, 1)$
$790: P_{26931} = (18, 8, 25, 1)$
$791: P_{26959} = (14, 9, 25, 1)$
$792: P_{26995} = (18, 10, 25, 1)$
$793: P_{27033} = (24, 11, 25, 1)$
$794: P_{27050} = (9, 12, 25, 1)$
$795: P_{27096} = (23, 13, 25, 1)$
$796: P_{27147} = (10, 15, 25, 1)$
$797: P_{27172} = (3, 16, 25, 1)$
$798: P_{27215} = (14, 17, 25, 1)$
$799: P_{27222} = (21, 17, 25, 1)$
$800: P_{27227} = (26, 17, 25, 1)$
$801: P_{27246} = (13, 18, 25, 1)$
$802: P_{27270} = (5, 19, 25, 1)$
$803: P_{27340} = (11, 21, 25, 1)$

804 : $P_{27390} = (29, 22, 25, 1)$
805 : $P_{27439} = (14, 24, 25, 1)$
806 : $P_{27519} = (30, 26, 25, 1)$
807 : $P_{27642} = (25, 30, 25, 1)$
808 : $P_{27686} = (5, 0, 26, 1)$
809 : $P_{27733} = (20, 1, 26, 1)$
810 : $P_{27762} = (17, 2, 26, 1)$
811 : $P_{27789} = (12, 3, 26, 1)$
812 : $P_{27799} = (22, 3, 26, 1)$
813 : $P_{27804} = (27, 3, 26, 1)$
814 : $P_{27818} = (9, 4, 26, 1)$
815 : $P_{27828} = (19, 4, 26, 1)$
816 : $P_{27836} = (27, 4, 26, 1)$
817 : $P_{27884} = (11, 6, 26, 1)$
818 : $P_{27932} = (27, 7, 26, 1)$
819 : $P_{27958} = (21, 8, 26, 1)$
820 : $P_{27975} = (6, 9, 26, 1)$
821 : $P_{28040} = (7, 11, 26, 1)$
822 : $P_{28078} = (13, 12, 26, 1)$
823 : $P_{28082} = (17, 12, 26, 1)$
824 : $P_{28094} = (29, 12, 26, 1)$
825 : $P_{28109} = (12, 13, 26, 1)$
826 : $P_{28141} = (12, 14, 26, 1)$
827 : $P_{28146} = (17, 14, 26, 1)$
828 : $P_{28157} = (28, 14, 26, 1)$
829 : $P_{28184} = (23, 15, 26, 1)$
830 : $P_{28212} = (19, 16, 26, 1)$
831 : $P_{28273} = (16, 18, 26, 1)$
832 : $P_{28304} = (15, 19, 26, 1)$
833 : $P_{28326} = (5, 20, 26, 1)$
834 : $P_{28340} = (19, 20, 26, 1)$
835 : $P_{28344} = (23, 20, 26, 1)$
836 : $P_{28367} = (14, 21, 26, 1)$
837 : $P_{28511} = (30, 25, 26, 1)$
838 : $P_{28521} = (8, 26, 26, 1)$
839 : $P_{28522} = (9, 26, 26, 1)$
840 : $P_{28568} = (23, 27, 26, 1)$
841 : $P_{28650} = (9, 30, 26, 1)$
842 : $P_{28699} = (26, 31, 26, 1)$
843 : $P_{28721} = (16, 0, 27, 1)$
844 : $P_{28747} = (10, 1, 27, 1)$
845 : $P_{28755} = (18, 1, 27, 1)$
846 : $P_{28762} = (25, 1, 27, 1)$
847 : $P_{28827} = (26, 3, 27, 1)$
848 : $P_{28843} = (10, 4, 27, 1)$
849 : $P_{28850} = (17, 4, 27, 1)$
850 : $P_{28859} = (26, 4, 27, 1)$
851 : $P_{28875} = (10, 5, 27, 1)$
852 : $P_{28921} = (24, 6, 27, 1)$
853 : $P_{28933} = (4, 7, 27, 1)$
854 : $P_{28955} = (26, 7, 27, 1)$
855 : $P_{28960} = (31, 7, 27, 1)$
856 : $P_{28984} = (23, 8, 27, 1)$
857 : $P_{29094} = (5, 12, 27, 1)$
858 : $P_{29156} = (3, 14, 27, 1)$
859 : $P_{29178} = (25, 14, 27, 1)$
860 : $P_{29180} = (27, 14, 27, 1)$
861 : $P_{29210} = (25, 15, 27, 1)$
862 : $P_{29220} = (3, 16, 27, 1)$
863 : $P_{29234} = (17, 16, 27, 1)$
864 : $P_{29236} = (19, 16, 27, 1)$
865 : $P_{29263} = (14, 17, 27, 1)$
866 : $P_{29265} = (16, 17, 27, 1)$
867 : $P_{29280} = (31, 17, 27, 1)$
868 : $P_{29292} = (11, 18, 27, 1)$
869 : $P_{29304} = (23, 18, 27, 1)$
870 : $P_{29310} = (29, 18, 27, 1)$
871 : $P_{29318} = (5, 19, 27, 1)$
872 : $P_{29362} = (17, 20, 27, 1)$
873 : $P_{29379} = (2, 21, 27, 1)$
874 : $P_{29440} = (31, 22, 27, 1)$
875 : $P_{29560} = (23, 26, 27, 1)$
876 : $P_{29668} = (3, 30, 27, 1)$
877 : $P_{29702} = (5, 31, 27, 1)$
878 : $P_{29747} = (18, 0, 28, 1)$
879 : $P_{29775} = (14, 1, 28, 1)$
880 : $P_{29797} = (4, 2, 28, 1)$
881 : $P_{29855} = (30, 3, 28, 1)$
882 : $P_{29862} = (5, 4, 28, 1)$
883 : $P_{29866} = (9, 4, 28, 1)$
884 : $P_{29870} = (13, 4, 28, 1)$
885 : $P_{29893} = (4, 5, 28, 1)$
886 : $P_{29936} = (15, 6, 28, 1)$
887 : $P_{29957} = (4, 7, 28, 1)$
888 : $P_{30009} = (24, 8, 28, 1)$
889 : $P_{30027} = (10, 9, 28, 1)$
890 : $P_{30067} = (18, 10, 28, 1)$
891 : $P_{30106} = (25, 11, 28, 1)$
892 : $P_{30308} = (3, 18, 28, 1)$
893 : $P_{30334} = (29, 18, 28, 1)$
894 : $P_{30336} = (31, 18, 28, 1)$
895 : $P_{30358} = (21, 19, 28, 1)$
896 : $P_{30510} = (13, 24, 28, 1)$
897 : $P_{30637} = (12, 28, 28, 1)$
898 : $P_{30638} = (13, 28, 28, 1)$
899 : $P_{30665} = (8, 29, 28, 1)$
900 : $P_{30695} = (6, 30, 28, 1)$
901 : $P_{30763} = (10, 0, 29, 1)$
902 : $P_{30829} = (12, 2, 29, 1)$
903 : $P_{30857} = (8, 3, 29, 1)$
904 : $P_{30866} = (17, 3, 29, 1)$
905 : $P_{30873} = (24, 3, 29, 1)$
906 : $P_{30902} = (21, 4, 29, 1)$
907 : $P_{30944} = (31, 5, 29, 1)$
908 : $P_{31060} = (19, 9, 29, 1)$
909 : $P_{31102} = (29, 10, 29, 1)$
910 : $P_{31184} = (15, 13, 29, 1)$
911 : $P_{31227} = (26, 14, 29, 1)$

912 : $P_{31237} = (4, 15, 29, 1)$
913 : $P_{31307} = (10, 17, 29, 1)$
914 : $P_{31357} = (28, 18, 29, 1)$
915 : $P_{31376} = (15, 19, 29, 1)$
916 : $P_{31399} = (6, 20, 29, 1)$
917 : $P_{31477} = (20, 22, 29, 1)$
918 : $P_{31539} = (18, 24, 29, 1)$
919 : $P_{31657} = (8, 28, 29, 1)$
920 : $P_{31728} = (15, 30, 29, 1)$
921 : $P_{31753} = (8, 31, 29, 1)$
922 : $P_{31797} = (20, 0, 30, 1)$
923 : $P_{31823} = (14, 1, 30, 1)$
924 : $P_{31829} = (20, 1, 30, 1)$
925 : $P_{31836} = (27, 1, 30, 1)$
926 : $P_{31843} = (2, 2, 30, 1)$
927 : $P_{31846} = (5, 2, 30, 1)$
928 : $P_{31847} = (6, 2, 30, 1)$
929 : $P_{31885} = (12, 3, 30, 1)$
930 : $P_{31896} = (23, 3, 30, 1)$
931 : $P_{31899} = (26, 3, 30, 1)$
932 : $P_{32029} = (28, 7, 30, 1)$
933 : $P_{32052} = (19, 8, 30, 1)$
934 : $P_{32111} = (14, 10, 30, 1)$
935 : $P_{32136} = (7, 11, 30, 1)$
936 : $P_{32137} = (8, 11, 30, 1)$
937 : $P_{32143} = (14, 11, 30, 1)$
938 : $P_{32172} = (11, 12, 30, 1)$
939 : $P_{32196} = (3, 13, 30, 1)$
940 : $P_{32238} = (13, 14, 30, 1)$
941 : $P_{32310} = (21, 16, 30, 1)$
942 : $P_{32345} = (24, 17, 30, 1)$
943 : $P_{32357} = (4, 18, 30, 1)$
944 : $P_{32380} = (27, 18, 30, 1)$
945 : $P_{32383} = (30, 18, 30, 1)$
946 : $P_{32412} = (27, 19, 30, 1)$
947 : $P_{32428} = (11, 20, 30, 1)$
948 : $P_{32456} = (7, 21, 30, 1)$
949 : $P_{32484} = (3, 22, 30, 1)$
950 : $P_{32556} = (11, 24, 30, 1)$
951 : $P_{32602} = (25, 25, 30, 1)$
952 : $P_{32618} = (9, 26, 30, 1)$
953 : $P_{32644} = (3, 27, 30, 1)$
954 : $P_{32679} = (6, 28, 30, 1)$
955 : $P_{32720} = (15, 29, 30, 1)$
956 : $P_{32743} = (6, 30, 30, 1)$
957 : $P_{32744} = (7, 30, 30, 1)$
958 : $P_{32786} = (17, 31, 30, 1)$
959 : $P_{32825} = (24, 0, 31, 1)$
960 : $P_{32871} = (6, 2, 31, 1)$
961 : $P_{32921} = (24, 3, 31, 1)$
962 : $P_{32989} = (28, 5, 31, 1)$
963 : $P_{33007} = (14, 6, 31, 1)$
964 : $P_{33044} = (19, 7, 31, 1)$
965 : $P_{33071} = (14, 8, 31, 1)$
966 : $P_{33076} = (19, 8, 31, 1)$
967 : $P_{33085} = (28, 8, 31, 1)$
968 : $P_{33189} = (4, 12, 31, 1)$
969 : $P_{33226} = (9, 13, 31, 1)$
970 : $P_{33237} = (20, 13, 31, 1)$
971 : $P_{33245} = (28, 13, 31, 1)$
972 : $P_{33251} = (2, 14, 31, 1)$
973 : $P_{33262} = (13, 14, 31, 1)$
974 : $P_{33263} = (14, 14, 31, 1)$
975 : $P_{33289} = (8, 15, 31, 1)$
976 : $P_{33300} = (19, 15, 31, 1)$
977 : $P_{33307} = (26, 15, 31, 1)$
978 : $P_{33367} = (22, 17, 31, 1)$
979 : $P_{33380} = (3, 18, 31, 1)$
980 : $P_{33385} = (8, 18, 31, 1)$
981 : $P_{33387} = (10, 18, 31, 1)$
982 : $P_{33462} = (21, 20, 31, 1)$
983 : $P_{33488} = (15, 21, 31, 1)$
984 : $P_{33493} = (20, 21, 31, 1)$
985 : $P_{33499} = (26, 21, 31, 1)$
986 : $P_{33521} = (16, 22, 31, 1)$
987 : $P_{33589} = (20, 24, 31, 1)$
988 : $P_{33659} = (26, 26, 31, 1)$
989 : $P_{33670} = (5, 27, 31, 1)$
990 : $P_{33737} = (8, 29, 31, 1)$
991 : $P_{33778} = (17, 30, 31, 1)$

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_{67}	P_{67}

Line 1 intersects

Line	ℓ_0	ℓ_2
in point	P_{67}	P_{67}

Line 2 intersects

Line	ℓ_0	ℓ_1
in point	P_{67}	P_{67}

The surface has 1089 points:
Too many to print.