Rank-74243 over GF(32)

January 15, 2021

The equation

The equation of the surface is :

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

(0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 1, 0, 0, 1, 0, 0, 0)
The point rank of the equation over GF(32) is 1108378661

General information

Number of lines	4
Number of points	1089
Number of singular points	2
Number of Eckardt points	1
Number of double points	2
Number of single points	125
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	3, 2^2, 1^{125}, 0^{961}

Singular Points

The surface has 2 singular points:

$0: \ P_0 = \mathbf{P}(1,0,0,0) = \mathbf{P}(1,0,0,0)$
$1: \ P_2 = \mathbf{P}(0,0,1,0) = \mathbf{P}(0,0,1,0)$

The 4 Lines

The lines and their Pluecker coordinates are:

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

$$\ell_1 = \left[\begin{array}{cccc} 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 \end{array}\right]_{1024} = \left[\begin{array}{cccc} 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 \end{array}\right]_{1024} = \mathbf{Pl}(0,0,1,0,0,0)_2$$

$$\ell_2 = \left[\begin{array}{cccc} 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \end{array}\right]_{1082368} = \left[\begin{array}{cccc} 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \end{array}\right]_{1082368} = \mathbf{Pl}(0,0,0,0,0,1)_{34849}$$

$$\ell_3 = \left[\begin{array}{cccc} 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{array}\right]_{1083424} = \left[\begin{array}{cccc} 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{array}\right]_{1083424} = \mathbf{Pl}(0,1,0,0,0,0)_1$$

Rank of lines: (0, 1024, 1082368, 1083424)
Rank of points on Klein quadric: (0, 2, 34849, 1)

Eckardt Points

The surface has 1 Eckardt points:
$0 : P_2 = \mathbf{P}(0,0,1,0) = \mathbf{P}(0,0,1,0)$.

Double Points

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

$P_0 = (1,0,0,0) = \ell_0 \cap \ell_1$
$P_1 = (0,1,0,0) = \ell_0 \cap \ell_2$

Single Points

The surface has 125 single points:
The single points on the surface are:

$0 : P_3 = (0,0,0,1)$ lies on line ℓ_3
$1 : P_5 = (1,1,0,0)$ lies on line ℓ_0
$2 : P_6 = (2,1,0,0)$ lies on line ℓ_0
$3 : P_7 = (3,1,0,0)$ lies on line ℓ_0
$4 : P_8 = (4,1,0,0)$ lies on line ℓ_0
$5 : P_9 = (5,1,0,0)$ lies on line ℓ_0
$6 : P_{10} = (6,1,0,0)$ lies on line ℓ_0
$7 : P_{11} = (7,1,0,0)$ lies on line ℓ_0
$8 : P_{12} = (8,1,0,0)$ lies on line ℓ_0
$9 : P_{13} = (9,1,0,0)$ lies on line ℓ_0
$10 : P_{14} = (10,1,0,0)$ lies on line ℓ_0
$11 : P_{15} = (11,1,0,0)$ lies on line ℓ_0
$12 : P_{16} = (12,1,0,0)$ lies on line ℓ_0
$13 : P_{17} = (13,1,0,0)$ lies on line ℓ_0
$14 : P_{18} = (14,1,0,0)$ lies on line ℓ_0
$15 : P_{19} = (15,1,0,0)$ lies on line ℓ_0
$16 : P_{20} = (16,1,0,0)$ lies on line ℓ_0
$17 : P_{21} = (17,1,0,0)$ lies on line ℓ_0
$18 : P_{22} = (18,1,0,0)$ lies on line ℓ_0
$19 : P_{23} = (19,1,0,0)$ lies on line ℓ_0
$20 : P_{24} = (20,1,0,0)$ lies on line ℓ_0
$21 : P_{25} = (21,1,0,0)$ lies on line ℓ_0
$22 : P_{26} = (22,1,0,0)$ lies on line ℓ_0
$23 : P_{27} = (23,1,0,0)$ lies on line ℓ_0
$24 : P_{28} = (24,1,0,0)$ lies on line ℓ_0
$25 : P_{29} = (25,1,0,0)$ lies on line ℓ_0
$26 : P_{30} = (26,1,0,0)$ lies on line ℓ_0
$27 : P_{31} = (27,1,0,0)$ lies on line ℓ_0
$28 : P_{32} = (28,1,0,0)$ lies on line ℓ_0
$29 : P_{33} = (29,1,0,0)$ lies on line ℓ_0
$30 : P_{34} = (30,1,0,0)$ lies on line ℓ_0
$31 : P_{35} = (31,1,0,0)$ lies on line ℓ_0
$32 : P_{36} = (1,0,1,0)$ lies on line ℓ_1
$33 : P_{37} = (2,0,1,0)$ lies on line ℓ_1
$34 : P_{38} = (3,0,1,0)$ lies on line ℓ_1
$35 : P_{39} = (4,0,1,0)$ lies on line ℓ_1
$36 : P_{40} = (5,0,1,0)$ lies on line ℓ_1
$37 : P_{41} = (6,0,1,0)$ lies on line ℓ_1
$38 : P_{42} = (7,0,1,0)$ lies on line ℓ_1
$39 : P_{43} = (8,0,1,0)$ lies on line ℓ_1
$40 : P_{44} = (9,0,1,0)$ lies on line ℓ_1
$41 : P_{45} = (10,0,1,0)$ lies on line ℓ_1
$42 : P_{46} = (11,0,1,0)$ lies on line ℓ_1
$43 : P_{47} = (12,0,1,0)$ lies on line ℓ_1

44 : $P_{48} = (13, 0, 1, 0)$ lies on line ℓ_1
45 : $P_{49} = (14, 0, 1, 0)$ lies on line ℓ_1
46 : $P_{50} = (15, 0, 1, 0)$ lies on line ℓ_1
47 : $P_{51} = (16, 0, 1, 0)$ lies on line ℓ_1
48 : $P_{52} = (17, 0, 1, 0)$ lies on line ℓ_1
49 : $P_{53} = (18, 0, 1, 0)$ lies on line ℓ_1
50 : $P_{54} = (19, 0, 1, 0)$ lies on line ℓ_1
51 : $P_{55} = (20, 0, 1, 0)$ lies on line ℓ_1
52 : $P_{56} = (21, 0, 1, 0)$ lies on line ℓ_1
53 : $P_{57} = (22, 0, 1, 0)$ lies on line ℓ_1
54 : $P_{58} = (23, 0, 1, 0)$ lies on line ℓ_1
55 : $P_{59} = (24, 0, 1, 0)$ lies on line ℓ_1
56 : $P_{60} = (25, 0, 1, 0)$ lies on line ℓ_1
57 : $P_{61} = (26, 0, 1, 0)$ lies on line ℓ_1
58 : $P_{62} = (27, 0, 1, 0)$ lies on line ℓ_1
59 : $P_{63} = (28, 0, 1, 0)$ lies on line ℓ_1
60 : $P_{64} = (29, 0, 1, 0)$ lies on line ℓ_1
61 : $P_{65} = (30, 0, 1, 0)$ lies on line ℓ_1
62 : $P_{66} = (31, 0, 1, 0)$ lies on line ℓ_1
63 : $P_{67} = (0, 1, 1, 0)$ lies on line ℓ_2
64 : $P_{99} = (0, 2, 1, 0)$ lies on line ℓ_2
65 : $P_{131} = (0, 3, 1, 0)$ lies on line ℓ_2
66 : $P_{163} = (0, 4, 1, 0)$ lies on line ℓ_2
67 : $P_{195} = (0, 5, 1, 0)$ lies on line ℓ_2
68 : $P_{227} = (0, 6, 1, 0)$ lies on line ℓ_2
69 : $P_{259} = (0, 7, 1, 0)$ lies on line ℓ_2
70 : $P_{291} = (0, 8, 1, 0)$ lies on line ℓ_2
71 : $P_{323} = (0, 9, 1, 0)$ lies on line ℓ_2
72 : $P_{355} = (0, 10, 1, 0)$ lies on line ℓ_2
73 : $P_{387} = (0, 11, 1, 0)$ lies on line ℓ_2
74 : $P_{419} = (0, 12, 1, 0)$ lies on line ℓ_2
75 : $P_{451} = (0, 13, 1, 0)$ lies on line ℓ_2
76 : $P_{483} = (0, 14, 1, 0)$ lies on line ℓ_2
77 : $P_{515} = (0, 15, 1, 0)$ lies on line ℓ_2
78 : $P_{547} = (0, 16, 1, 0)$ lies on line ℓ_2
79 : $P_{579} = (0, 17, 1, 0)$ lies on line ℓ_2
80 : $P_{611} = (0, 18, 1, 0)$ lies on line ℓ_2
81 : $P_{643} = (0, 19, 1, 0)$ lies on line ℓ_2
82 : $P_{675} = (0, 20, 1, 0)$ lies on line ℓ_2
83 : $P_{707} = (0, 21, 1, 0)$ lies on line ℓ_2
84 : $P_{739} = (0, 22, 1, 0)$ lies on line ℓ_2
85 : $P_{771} = (0, 23, 1, 0)$ lies on line ℓ_2
86 : $P_{803} = (0, 24, 1, 0)$ lies on line ℓ_2
87 : $P_{835} = (0, 25, 1, 0)$ lies on line ℓ_2
88 : $P_{867} = (0, 26, 1, 0)$ lies on line ℓ_2
89 : $P_{899} = (0, 27, 1, 0)$ lies on line ℓ_2
90 : $P_{931} = (0, 28, 1, 0)$ lies on line ℓ_2
91 : $P_{963} = (0, 29, 1, 0)$ lies on line ℓ_2
92 : $P_{995} = (0, 30, 1, 0)$ lies on line ℓ_2
93 : $P_{1027} = (0, 31, 1, 0)$ lies on line ℓ_2
94 : $P_{2082} = (0, 0, 1, 1)$ lies on line ℓ_3
95 : $P_{3105} = (0, 0, 2, 1)$ lies on line ℓ_3
96 : $P_{4129} = (0, 0, 3, 1)$ lies on line ℓ_3
97 : $P_{5153} = (0, 0, 4, 1)$ lies on line ℓ_3
98 : $P_{6177} = (0, 0, 5, 1)$ lies on line ℓ_3
99 : $P_{7201} = (0, 0, 6, 1)$ lies on line ℓ_3
100 : $P_{8225} = (0, 0, 7, 1)$ lies on line ℓ_3
101 : $P_{9249} = (0, 0, 8, 1)$ lies on line ℓ_3
102 : $P_{10273} = (0, 0, 9, 1)$ lies on line ℓ_3
103 : $P_{11297} = (0, 0, 10, 1)$ lies on line ℓ_3
104 : $P_{12321} = (0, 0, 11, 1)$ lies on line ℓ_3
105 : $P_{13345} = (0, 0, 12, 1)$ lies on line ℓ_3
106 : $P_{14369} = (0, 0, 13, 1)$ lies on line ℓ_3
107 : $P_{15393} = (0, 0, 14, 1)$ lies on line ℓ_3
108 : $P_{16417} = (0, 0, 15, 1)$ lies on line ℓ_3
109 : $P_{17441} = (0, 0, 16, 1)$ lies on line ℓ_3
110 : $P_{18465} = (0, 0, 17, 1)$ lies on line ℓ_3
111 : $P_{19489} = (0, 0, 18, 1)$ lies on line ℓ_3
112 : $P_{20513} = (0, 0, 19, 1)$ lies on line ℓ_3
113 : $P_{21537} = (0, 0, 20, 1)$ lies on line ℓ_3
114 : $P_{22561} = (0, 0, 21, 1)$ lies on line ℓ_3
115 : $P_{23585} = (0, 0, 22, 1)$ lies on line ℓ_3
116 : $P_{24609} = (0, 0, 23, 1)$ lies on line ℓ_3
117 : $P_{25633} = (0, 0, 24, 1)$ lies on line ℓ_3
118 : $P_{26657} = (0, 0, 25, 1)$ lies on line ℓ_3
119 : $P_{27681} = (0, 0, 26, 1)$ lies on line ℓ_3
120 : $P_{28705} = (0, 0, 27, 1)$ lies on line ℓ_3
121 : $P_{29729} = (0, 0, 28, 1)$ lies on line ℓ_3
122 : $P_{30753} = (0, 0, 29, 1)$ lies on line ℓ_3
123 : $P_{31777} = (0, 0, 30, 1)$ lies on line ℓ_3
124 : $P_{32801} = (0, 0, 31, 1)$ lies on line ℓ_3

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 : $P_{1270} = (20, 6, 0, 1)$

$6:\ P_{1303} = (21, 7, 0, 1)$
$7:\ P_{1324} = (10, 8, 0, 1)$
$8:\ P_{1357} = (11, 9, 0, 1)$
$9:\ P_{1392} = (14, 10, 0, 1)$
$10:\ P_{1425} = (15, 11, 0, 1)$
$11:\ P_{1468} = (26, 12, 0, 1)$
$12:\ P_{1501} = (27, 13, 0, 1)$
$13:\ P_{1536} = (30, 14, 0, 1)$
$14:\ P_{1569} = (31, 15, 0, 1)$
$15:\ P_{1583} = (13, 16, 0, 1)$
$16:\ P_{1614} = (12, 17, 0, 1)$
$17:\ P_{1643} = (9, 18, 0, 1)$
$18:\ P_{1674} = (8, 19, 0, 1)$
$19:\ P_{1727} = (29, 20, 0, 1)$
$20:\ P_{1758} = (28, 21, 0, 1)$
$21:\ P_{1787} = (25, 22, 0, 1)$
$22:\ P_{1818} = (24, 23, 0, 1)$
$23:\ P_{1833} = (7, 24, 0, 1)$
$24:\ P_{1864} = (6, 25, 0, 1)$
$25:\ P_{1893} = (3, 26, 0, 1)$
$26:\ P_{1924} = (2, 27, 0, 1)$
$27:\ P_{1977} = (23, 28, 0, 1)$
$28:\ P_{2008} = (22, 29, 0, 1)$
$29:\ P_{2037} = (19, 30, 0, 1)$
$30:\ P_{2068} = (18, 31, 0, 1)$
$31:\ P_{2176} = (31, 2, 1, 1)$
$32:\ P_{2193} = (16, 3, 1, 1)$
$33:\ P_{2227} = (18, 4, 1, 1)$
$34:\ P_{2254} = (13, 5, 1, 1)$
$35:\ P_{2284} = (11, 6, 1, 1)$
$36:\ P_{2313} = (8, 7, 1, 1)$
$37:\ P_{2350} = (13, 8, 1, 1)$
$38:\ P_{2399} = (30, 9, 1, 1)$
$39:\ P_{2428} = (27, 10, 1, 1)$
$40:\ P_{2452} = (19, 11, 1, 1)$
$41:\ P_{2467} = (2, 12, 1, 1)$
$42:\ P_{2508} = (11, 13, 1, 1)$
$43:\ P_{2531} = (2, 14, 1, 1)$
$44:\ P_{2569} = (8, 15, 1, 1)$
$45:\ P_{2602} = (9, 16, 1, 1)$
$46:\ P_{2652} = (27, 17, 1, 1)$
$47:\ P_{2671} = (14, 18, 1, 1)$
$48:\ P_{2705} = (16, 19, 1, 1)$
$49:\ P_{2736} = (15, 20, 1, 1)$
$50:\ P_{2763} = (10, 21, 1, 1)$
$51:\ P_{2803} = (18, 22, 1, 1)$
$52:\ P_{2847} = (30, 23, 1, 1)$
$53:\ P_{2868} = (19, 24, 1, 1)$
$54:\ P_{2890} = (9, 25, 1, 1)$
$55:\ P_{2917} = (4, 26, 1, 1)$
$56:\ P_{2960} = (15, 27, 1, 1)$
$57:\ P_{2991} = (14, 28, 1, 1)$
$58:\ P_{3040} = (31, 29, 1, 1)$
$59:\ P_{3045} = (4, 30, 1, 1)$
$60:\ P_{3083} = (10, 31, 1, 1)$
$61:\ P_{3165} = (28, 1, 2, 1)$
$62:\ P_{3191} = (22, 2, 2, 1)$
$63:\ P_{3226} = (25, 3, 2, 1)$
$64:\ P_{3243} = (10, 4, 2, 1)$
$65:\ P_{3294} = (29, 5, 2, 1)$
$66:\ P_{3315} = (18, 6, 2, 1)$
$67:\ P_{3347} = (18, 7, 2, 1)$
$68:\ P_{3372} = (11, 8, 2, 1)$
$69:\ P_{3410} = (17, 9, 2, 1)$
$70:\ P_{3449} = (24, 10, 2, 1)$
$71:\ P_{3479} = (22, 11, 2, 1)$
$72:\ P_{3520} = (31, 12, 2, 1)$
$73:\ P_{3522} = (1, 13, 2, 1)$
$74:\ P_{3570} = (17, 14, 2, 1)$
$75:\ P_{3586} = (1, 15, 2, 1)$
$76:\ P_{3627} = (10, 16, 2, 1)$
$77:\ P_{3651} = (2, 17, 2, 1)$
$78:\ P_{3717} = (4, 19, 2, 1)$
$79:\ P_{3770} = (25, 20, 2, 1)$
$80:\ P_{3779} = (2, 21, 2, 1)$
$81:\ P_{3830} = (21, 22, 2, 1)$
$82:\ P_{3872} = (31, 23, 2, 1)$
$83:\ P_{3889} = (16, 24, 2, 1)$
$84:\ P_{3926} = (21, 25, 2, 1)$
$85:\ P_{3966} = (29, 26, 2, 1)$
$86:\ P_{3973} = (4, 27, 2, 1)$
$87:\ P_{4029} = (28, 28, 2, 1)$
$88:\ P_{4049} = (16, 29, 2, 1)$
$89:\ P_{4076} = (11, 30, 2, 1)$
$90:\ P_{4121} = (24, 31, 2, 1)$
$91:\ P_{4179} = (18, 1, 3, 1)$
$92:\ P_{4214} = (21, 2, 3, 1)$
$93:\ P_{4233} = (8, 3, 3, 1)$
$94:\ P_{4268} = (11, 4, 3, 1)$
$95:\ P_{4298} = (9, 5, 3, 1)$
$96:\ P_{4328} = (7, 6, 3, 1)$
$97:\ P_{4359} = (6, 7, 3, 1)$
$98:\ P_{4399} = (14, 8, 3, 1)$
$99:\ P_{4420} = (3, 9, 3, 1)$
$100:\ P_{4471} = (22, 10, 3, 1)$
$101:\ P_{4498} = (17, 11, 3, 1)$
$102:\ P_{4516} = (3, 12, 3, 1)$
$103:\ P_{4551} = (6, 13, 3, 1)$
$104:\ P_{4597} = (20, 14, 3, 1)$
$105:\ P_{4616} = (7, 15, 3, 1)$
$106:\ P_{4643} = (2, 16, 3, 1)$
$107:\ P_{4698} = (25, 17, 3, 1)$
$108:\ P_{4723} = (18, 18, 3, 1)$
$109:\ P_{4767} = (30, 19, 3, 1)$
$110:\ P_{4799} = (30, 20, 3, 1)$
$111:\ P_{4823} = (22, 21, 3, 1)$
$112:\ P_{4835} = (2, 22, 3, 1)$
$113:\ P_{4885} = (20, 23, 3, 1)$

$114: P_{4918} = (21, 24, 3, 1)$
$115: P_{4940} = (11, 25, 3, 1)$
$116: P_{4975} = (14, 26, 3, 1)$
$117: P_{5001} = (8, 27, 3, 1)$
$118: P_{5074} = (17, 29, 3, 1)$
$119: P_{5098} = (9, 30, 3, 1)$
$120: P_{5146} = (25, 31, 3, 1)$
$121: P_{5208} = (23, 1, 4, 1)$
$122: P_{5233} = (16, 2, 4, 1)$
$123: P_{5271} = (22, 3, 4, 1)$
$124: P_{5306} = (25, 4, 4, 1)$
$125: P_{5319} = (6, 5, 4, 1)$
$126: P_{5373} = (28, 6, 4, 1)$
$127: P_{5390} = (13, 7, 4, 1)$
$128: P_{5425} = (16, 8, 4, 1)$
$129: P_{5488} = (15, 10, 4, 1)$
$130: P_{5517} = (12, 11, 4, 1)$
$131: P_{5541} = (4, 12, 4, 1)$
$132: P_{5583} = (14, 13, 4, 1)$
$133: P_{5608} = (7, 14, 4, 1)$
$134: P_{5658} = (25, 15, 4, 1)$
$135: P_{5679} = (14, 16, 4, 1)$
$136: P_{5719} = (22, 17, 4, 1)$
$137: P_{5736} = (7, 18, 4, 1)$
$138: P_{5776} = (15, 19, 4, 1)$
$139: P_{5802} = (9, 20, 4, 1)$
$140: P_{5834} = (9, 21, 4, 1)$
$141: P_{5870} = (13, 22, 4, 1)$
$142: P_{5912} = (23, 23, 4, 1)$
$143: P_{5939} = (18, 24, 4, 1)$
$144: P_{5981} = (28, 25, 4, 1)$
$145: P_{6003} = (18, 26, 4, 1)$
$146: P_{6018} = (1, 27, 4, 1)$
$147: P_{6053} = (4, 28, 4, 1)$
$148: P_{6087} = (6, 29, 4, 1)$
$149: P_{6125} = (12, 30, 4, 1)$
$150: P_{6146} = (1, 31, 4, 1)$
$151: P_{6218} = (9, 1, 5, 1)$
$152: P_{6251} = (10, 2, 5, 1)$
$153: P_{6303} = (30, 3, 5, 1)$
$154: P_{6333} = (28, 4, 5, 1)$
$155: P_{6347} = (10, 5, 5, 1)$
$156: P_{6384} = (15, 6, 5, 1)$
$157: P_{6429} = (28, 7, 5, 1)$
$158: P_{6452} = (19, 8, 5, 1)$
$159: P_{6474} = (9, 9, 5, 1)$
$160: P_{6527} = (30, 10, 5, 1)$
$161: P_{6534} = (5, 11, 5, 1)$
$162: P_{6567} = (6, 12, 5, 1)$
$163: P_{6597} = (4, 13, 5, 1)$
$164: P_{6650} = (25, 14, 5, 1)$
$165: P_{6669} = (12, 15, 5, 1)$
$166: P_{6704} = (15, 16, 5, 1)$
$167: P_{6732} = (11, 17, 5, 1)$
$168: P_{6759} = (6, 18, 5, 1)$
$169: P_{6796} = (11, 19, 5, 1)$
$170: P_{6838} = (21, 20, 5, 1)$
$171: P_{6869} = (20, 21, 5, 1)$
$172: P_{6893} = (12, 22, 5, 1)$
$173: P_{6974} = (29, 24, 5, 1)$
$174: P_{6981} = (4, 25, 5, 1)$
$175: P_{7014} = (5, 26, 5, 1)$
$176: P_{7061} = (20, 27, 5, 1)$
$177: P_{7098} = (25, 28, 5, 1)$
$178: P_{7124} = (19, 29, 5, 1)$
$179: P_{7166} = (29, 30, 5, 1)$
$180: P_{7190} = (21, 31, 5, 1)$
$181: P_{7245} = (12, 1, 6, 1)$
$182: P_{7290} = (25, 2, 6, 1)$
$183: P_{7323} = (26, 3, 6, 1)$
$184: P_{7346} = (17, 4, 6, 1)$
$185: P_{7384} = (23, 5, 6, 1)$
$186: P_{7420} = (27, 6, 6, 1)$
$187: P_{7430} = (5, 7, 6, 1)$
$188: P_{7475} = (18, 8, 6, 1)$
$189: P_{7511} = (22, 9, 6, 1)$
$190: P_{7542} = (21, 10, 6, 1)$
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653 : $P_{23318} = (21, 23, 21, 1)$

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682 : $P_{24347} = (26, 23, 22, 1)$
683 : $P_{24370} = (17, 24, 22, 1)$
684 : $P_{24399} = (14, 25, 22, 1)$
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686 : $P_{24452} = (3, 27, 22, 1)$
687 : $P_{24502} = (21, 28, 22, 1)$
688 : $P_{24539} = (26, 29, 22, 1)$
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703 : $P_{25061} = (4, 14, 23, 1)$
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707 : $P_{25198} = (13, 18, 23, 1)$
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717 : $P_{25515} = (10, 28, 23, 1)$
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723 : $P_{25756} = (27, 3, 24, 1)$
724 : $P_{25776} = (15, 4, 24, 1)$
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727 : $P_{25873} = (16, 7, 24, 1)$
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733 : $P_{26077} = (28, 13, 24, 1)$
734 : $P_{26087} = (6, 14, 24, 1)$
735 : $P_{26115} = (2, 15, 24, 1)$
736 : $P_{26148} = (3, 16, 24, 1)$
737 : $P_{26233} = (24, 18, 24, 1)$
738 : $P_{26255} = (14, 19, 24, 1)$
739 : $P_{26279} = (6, 20, 24, 1)$
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741 : $P_{26367} = (30, 22, 24, 1)$
742 : $P_{26383} = (14, 23, 24, 1)$
743 : $P_{26416} = (15, 24, 24, 1)$
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745 : $P_{26467} = (2, 26, 24, 1)$
746 : $P_{26502} = (5, 27, 24, 1)$
747 : $P_{26551} = (22, 28, 24, 1)$
748 : $P_{26564} = (3, 29, 24, 1)$
749 : $P_{26609} = (16, 30, 24, 1)$
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751 : $P_{26706} = (17, 1, 25, 1)$
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757 : $P_{26893} = (12, 7, 25, 1)$
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761 : $P_{27052} = (11, 12, 25, 1)$

762 : $P_{27080} = (7, 13, 25, 1)$
763 : $P_{27127} = (22, 14, 25, 1)$
764 : $P_{27164} = (27, 15, 25, 1)$
765 : $P_{27174} = (5, 16, 25, 1)$
766 : $P_{27218} = (17, 17, 25, 1)$
767 : $P_{27262} = (29, 18, 25, 1)$
768 : $P_{27296} = (31, 19, 25, 1)$
769 : $P_{27308} = (11, 20, 25, 1)$
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771 : $P_{27364} = (3, 22, 25, 1)$
772 : $P_{27421} = (28, 23, 25, 1)$
773 : $P_{27428} = (3, 24, 25, 1)$
774 : $P_{27470} = (13, 25, 25, 1)$
775 : $P_{27501} = (12, 26, 25, 1)$
776 : $P_{27543} = (22, 27, 25, 1)$
777 : $P_{27569} = (16, 28, 25, 1)$
778 : $P_{27598} = (13, 29, 25, 1)$
779 : $P_{27644} = (27, 30, 25, 1)$
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782 : $P_{27754} = (9, 2, 26, 1)$
783 : $P_{27795} = (18, 3, 26, 1)$
784 : $P_{27836} = (27, 4, 26, 1)$
785 : $P_{27863} = (22, 5, 26, 1)$
786 : $P_{27887} = (14, 6, 26, 1)$
787 : $P_{27934} = (29, 7, 26, 1)$
788 : $P_{27966} = (29, 8, 26, 1)$
789 : $P_{27974} = (5, 9, 26, 1)$
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792 : $P_{28075} = (10, 12, 26, 1)$
793 : $P_{28116} = (19, 13, 26, 1)$
794 : $P_{28147} = (18, 14, 26, 1)$
795 : $P_{28183} = (22, 15, 26, 1)$
796 : $P_{28218} = (25, 16, 26, 1)$
797 : $P_{28251} = (26, 17, 26, 1)$
798 : $P_{28283} = (26, 18, 26, 1)$
799 : $P_{28299} = (10, 19, 26, 1)$
800 : $P_{28326} = (5, 20, 26, 1)$
801 : $P_{28394} = (9, 22, 26, 1)$
802 : $P_{28424} = (7, 23, 26, 1)$
803 : $P_{28474} = (25, 24, 26, 1)$
804 : $P_{28505} = (24, 25, 26, 1)$
805 : $P_{28532} = (19, 26, 26, 1)$
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808 : $P_{28636} = (27, 29, 26, 1)$
809 : $P_{28655} = (14, 30, 26, 1)$
810 : $P_{28704} = (31, 31, 26, 1)$
811 : $P_{28758} = (21, 1, 27, 1)$
812 : $P_{28777} = (8, 2, 27, 1)$
813 : $P_{28821} = (20, 3, 27, 1)$
814 : $P_{28841} = (8, 4, 27, 1)$
815 : $P_{28892} = (27, 5, 27, 1)$
816 : $P_{28919} = (22, 6, 27, 1)$
817 : $P_{28956} = (27, 7, 27, 1)$
818 : $P_{28984} = (23, 8, 27, 1)$
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821 : $P_{29058} = (1, 11, 27, 1)$
822 : $P_{29109} = (20, 12, 27, 1)$
823 : $P_{29123} = (2, 13, 27, 1)$
824 : $P_{29162} = (9, 14, 27, 1)$
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826 : $P_{29218} = (1, 16, 27, 1)$
827 : $P_{29264} = (15, 17, 27, 1)$
828 : $P_{29286} = (5, 18, 27, 1)$
829 : $P_{29322} = (9, 19, 27, 1)$
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831 : $P_{29398} = (21, 21, 27, 1)$
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833 : $P_{29445} = (4, 23, 27, 1)$
834 : $P_{29504} = (31, 24, 27, 1)$
835 : $P_{29536} = (31, 25, 27, 1)$
836 : $P_{29559} = (22, 26, 27, 1)$
837 : $P_{29598} = (29, 27, 27, 1)$
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839 : $P_{29640} = (7, 29, 27, 1)$
840 : $P_{29667} = (2, 30, 27, 1)$
841 : $P_{29780} = (19, 1, 28, 1)$
842 : $P_{29805} = (12, 2, 28, 1)$
843 : $P_{29864} = (7, 4, 28, 1)$
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845 : $P_{29933} = (12, 6, 28, 1)$
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847 : $P_{30007} = (22, 8, 28, 1)$
848 : $P_{30030} = (13, 9, 28, 1)$
849 : $P_{30051} = (2, 10, 28, 1)$
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851 : $P_{30129} = (16, 12, 28, 1)$
852 : $P_{30166} = (21, 13, 28, 1)$
853 : $P_{30185} = (8, 14, 28, 1)$
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855 : $P_{30267} = (26, 16, 28, 1)$
856 : $P_{30286} = (13, 17, 28, 1)$
857 : $P_{30315} = (10, 18, 28, 1)$
858 : $P_{30356} = (19, 19, 28, 1)$
859 : $P_{30379} = (10, 20, 28, 1)$
860 : $P_{30409} = (8, 21, 28, 1)$
861 : $P_{30457} = (24, 22, 28, 1)$
862 : $P_{30467} = (2, 23, 28, 1)$
863 : $P_{30525} = (28, 24, 28, 1)$
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865 : $P_{30568} = (7, 26, 28, 1)$
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867 : $P_{30634} = (9, 28, 28, 1)$
868 : $P_{30678} = (21, 29, 28, 1)$
869 : $P_{30713} = (24, 30, 28, 1)$

870 : $P_{30737} = (16, 31, 28, 1)$
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872 : $P_{30843} = (26, 2, 29, 1)$
873 : $P_{30852} = (3, 3, 29, 1)$
874 : $P_{30904} = (23, 4, 29, 1)$
875 : $P_{30931} = (18, 5, 29, 1)$
876 : $P_{30949} = (4, 6, 29, 1)$
877 : $P_{30979} = (2, 7, 29, 1)$
878 : $P_{31029} = (20, 8, 29, 1)$
879 : $P_{31057} = (16, 9, 29, 1)$
880 : $P_{31089} = (16, 10, 29, 1)$
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882 : $P_{31144} = (7, 12, 29, 1)$
883 : $P_{31195} = (26, 13, 29, 1)$
884 : $P_{31212} = (11, 14, 29, 1)$
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886 : $P_{31285} = (20, 16, 29, 1)$
887 : $P_{31302} = (5, 17, 29, 1)$
888 : $P_{31360} = (31, 18, 29, 1)$
889 : $P_{31405} = (12, 20, 29, 1)$
890 : $P_{31432} = (7, 21, 29, 1)$
891 : $P_{31467} = (10, 22, 29, 1)$
892 : $P_{31494} = (5, 23, 29, 1)$
893 : $P_{31523} = (2, 24, 29, 1)$
894 : $P_{31571} = (18, 25, 29, 1)$
895 : $P_{31595} = (10, 26, 29, 1)$
896 : $P_{31648} = (31, 27, 29, 1)$
897 : $P_{31661} = (12, 28, 29, 1)$
898 : $P_{31685} = (4, 29, 29, 1)$
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901 : $P_{31836} = (27, 1, 30, 1)$
902 : $P_{31855} = (14, 2, 30, 1)$
903 : $P_{31892} = (19, 3, 30, 1)$
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905 : $P_{31957} = (20, 5, 30, 1)$
906 : $P_{32000} = (31, 6, 30, 1)$
907 : $P_{32015} = (14, 7, 30, 1)$
908 : $P_{32034} = (1, 8, 30, 1)$
909 : $P_{32077} = (12, 9, 30, 1)$
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911 : $P_{32160} = (31, 11, 30, 1)$
912 : $P_{32184} = (23, 12, 30, 1)$
913 : $P_{32202} = (9, 13, 30, 1)$
914 : $P_{32246} = (21, 14, 30, 1)$
915 : $P_{32267} = (10, 15, 30, 1)$
916 : $P_{32317} = (28, 16, 30, 1)$
917 : $P_{32342} = (21, 17, 30, 1)$
918 : $P_{32372} = (19, 18, 30, 1)$
919 : $P_{32403} = (18, 19, 30, 1)$
920 : $P_{32461} = (12, 21, 30, 1)$
921 : $P_{32482} = (1, 22, 30, 1)$
922 : $P_{32530} = (17, 23, 30, 1)$
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924 : $P_{32580} = (3, 25, 30, 1)$
925 : $P_{32637} = (28, 26, 30, 1)$
926 : $P_{32668} = (27, 27, 30, 1)$
927 : $P_{32691} = (18, 28, 30, 1)$
928 : $P_{32715} = (10, 29, 30, 1)$
929 : $P_{32740} = (3, 30, 30, 1)$
930 : $P_{32786} = (17, 31, 30, 1)$
931 : $P_{32853} = (20, 1, 31, 1)$
932 : $P_{32895} = (30, 2, 31, 1)$
933 : $P_{32898} = (1, 3, 31, 1)$
934 : $P_{32934} = (5, 4, 31, 1)$
935 : $P_{32965} = (4, 5, 31, 1)$
936 : $P_{33019} = (26, 6, 31, 1)$
937 : $P_{33050} = (25, 7, 31, 1)$
938 : $P_{33062} = (5, 8, 31, 1)$
939 : $P_{33117} = (28, 9, 31, 1)$
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941 : $P_{33169} = (16, 11, 31, 1)$
942 : $P_{33203} = (18, 12, 31, 1)$
943 : $P_{33233} = (16, 13, 31, 1)$
944 : $P_{33252} = (3, 14, 31, 1)$
945 : $P_{33311} = (30, 15, 31, 1)$
946 : $P_{33335} = (22, 16, 31, 1)$
947 : $P_{33363} = (18, 17, 31, 1)$
948 : $P_{33404} = (27, 18, 31, 1)$
949 : $P_{33436} = (27, 19, 31, 1)$
950 : $P_{33461} = (20, 20, 31, 1)$
951 : $P_{33492} = (19, 21, 31, 1)$
952 : $P_{33509} = (4, 22, 31, 1)$
953 : $P_{33556} = (19, 23, 31, 1)$
954 : $P_{33595} = (26, 24, 31, 1)$
955 : $P_{33609} = (8, 25, 31, 1)$
956 : $P_{33641} = (8, 26, 31, 1)$
957 : $P_{33698} = (1, 28, 31, 1)$
958 : $P_{33754} = (25, 29, 31, 1)$
959 : $P_{33783} = (22, 30, 31, 1)$
960 : $P_{33821} = (28, 31, 31, 1)$

Line Intersection Graph

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

Neighbor sets in the line intersection graph:
Line 0 intersects

Line	ℓ_1	ℓ_2
in point	P_0	P_1

Line 1 intersects

Line	ℓ_0	ℓ_2	ℓ_3
in point	P_0	P_2	P_2

Line 2 intersects

Line	ℓ_0	ℓ_1	ℓ_3
in point	P_1	P_2	P_2

Line 3 intersects

Line	ℓ_1	ℓ_2
in point	P_2	P_2

The surface has 1089 points:
Too many to print.