Rank-74052 over GF(16)

January 15, 2021

The equation

The equation of the surface is :

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

(1, 0, 0, 0, 0, 0, 1, 0, 1, 0, 0, 0, 0, 1, 0, 0, 1, 0, 0, 0)
The point rank of the equation over GF(16) is 303108374

General information

Number of lines	10
Number of points	321
Number of singular points	1
Number of Eckardt points	2
Number of double points	9
Number of single points	141
Number of points off lines	168
Number of Hesse planes	0
Number of axes	0
Type of points on lines	17^{10}
Type of lines on points	5, 3^2, 2^9, 1^{141}, 0^{168}

Singular Points

The surface has 1 singular points:

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

The 10 Lines

The lines and their Pluecker coordinates are:

$$\ell_0 = \left[\begin{array}{cccc} 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 \end{array}\right]_{69904} = \left[\begin{array}{cccc} 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 \end{array}\right]_{69904} = \mathbf{Pl}(0,0,0,1,0,0)_{33}$$

$$\ell_1 = \left[\begin{array}{cccc} 1 & 0 & 0 & \delta^5 \\ 0 & 1 & 0 & 0 \end{array}\right]_{48048} = \left[\begin{array}{cccc} 1 & 0 & 0 & 11 \\ 0 & 1 & 0 & 0 \end{array}\right]_{48048} = \mathbf{Pl}(10,0,0,1,0,0)_{43}$$

$$\ell_2 = \left[\begin{array}{cccc} 1 & 0 & 0 & \delta^{10} \\ 0 & 1 & 0 & 0 \end{array}\right]_{43680} = \left[\begin{array}{cccc} 1 & 0 & 0 & 10 \\ 0 & 1 & 0 & 0 \end{array}\right]_{43680} = \mathbf{Pl}(11,0,0,1,0,0)_{44}$$

$$\ell_3 = \left[\begin{array}{cccc} 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{array}\right]_{70160} = \left[\begin{array}{cccc} 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{array}\right]_{70160} = \mathbf{Pl}(0,1,0,0,0,0)_{1}$$

$$\ell_4 = \left[\begin{array}{cccc} 1 & 0 & 0 & \delta^5 \\ 0 & 0 & 1 & 0 \end{array}\right]_{48304} = \left[\begin{array}{cccc} 1 & 0 & 0 & 11 \\ 0 & 0 & 1 & 0 \end{array}\right]_{48304} = \mathbf{Pl}(0,11,1,0,0,0)_{28}$$

$$\ell_5 = \left[\begin{array}{cccc} 1 & 0 & 0 & \delta^{10} \\ 0 & 0 & 1 & 0 \end{array}\right]_{43936} = \left[\begin{array}{cccc} 1 & 0 & 0 & 10 \\ 0 & 0 & 1 & 0 \end{array}\right]_{43936} = \mathbf{Pl}(0,10,1,0,0,0)_{27}$$

$$\ell_6 = \left[\begin{array}{cccc} 1 & 1 & 0 & \delta^5 \\ 0 & 0 & 1 & 0 \end{array}\right]_{48577} = \left[\begin{array}{cccc} 1 & 1 & 0 & 11 \\ 0 & 0 & 1 & 0 \end{array}\right]_{48577} = \mathbf{Pl}(0,11,1,0,0,1)_{4682}$$

$$\ell_7 = \left[\begin{array}{cccc} 1 & 1 & 0 & \delta^{10} \\ 0 & 0 & 1 & 0 \end{array}\right]_{44209} = \left[\begin{array}{cccc} 1 & 1 & 0 & 10 \\ 0 & 0 & 1 & 0 \end{array}\right]_{44209} = \mathbf{Pl}(0,10,1,0,0,1)_{4681}$$

$$\ell_8 = \left[\begin{array}{cccc} 1 & 0 & 1 & \delta^{10} \\ 0 & 1 & 0 & 1 \end{array}\right]_{43969} = \left[\begin{array}{cccc} 1 & 0 & 1 & 10 \\ 0 & 1 & 0 & 1 \end{array}\right]_{43969} = \mathbf{Pl}(1,1,0,10,1,1)_{9336}$$

$$\ell_9 = \left[\begin{array}{cccc} 1 & 0 & 1 & \delta^5 \\ 0 & 1 & 0 & 1 \end{array}\right]_{48337} = \left[\begin{array}{cccc} 1 & 0 & 1 & 11 \\ 0 & 1 & 0 & 1 \end{array}\right]_{48337} = \mathbf{Pl}(1,1,0,11,1,1)_{9351}$$

Rank of lines: (69904, 48048, 43680, 70160, 48304, 43936, 48577, 44209, 43969, 48337)
Rank of points on Klein quadric: (33, 43, 44, 1, 28, 27, 4682, 4681, 9336, 9351)

Eckardt Points

The surface has 2 Eckardt points:
$0 : P_1 = \mathbf{P}(0,1,0,0) = \mathbf{P}(0,1,0,0)$,
$1 : P_{290} = \mathbf{P}(0,1,0,1) = \mathbf{P}(0,1,0,1)$.

Double Points

The surface has 9 Double points:
The double points on the surface are:

$P_3 = (0,0,0,1) = \ell_0 \cap \ell_3$
$P_{284} = (10,0,0,1) = \ell_1 \cap \ell_4$
$P_{444} = (10,10,0,1) = \ell_1 \cap \ell_6$
$P_{285} = (11,0,0,1) = \ell_2 \cap \ell_5$
$P_{461} = (11,11,0,1) = \ell_2 \cap \ell_7$
$P_{2843} = (10,0,10,1) = \ell_4 \cap \ell_9$
$P_{3100} = (11,0,11,1) = \ell_5 \cap \ell_8$
$P_{3003} = (10,10,10,1) = \ell_6 \cap \ell_8$
$P_{3276} = (11,11,11,1) = \ell_7 \cap \ell_9$

Single Points

The surface has 141 single points:
The single points on the surface are:

0 : $P_{180} = (1, 10, 1, 0)$ lies on line ℓ_8
1 : $P_{196} = (1, 11, 1, 0)$ lies on line ℓ_9
2 : $P_{300} = (10, 1, 0, 1)$ lies on line ℓ_1
3 : $P_{301} = (11, 1, 0, 1)$ lies on line ℓ_2
4 : $P_{306} = (0, 2, 0, 1)$ lies on line ℓ_0
5 : $P_{316} = (10, 2, 0, 1)$ lies on line ℓ_1
6 : $P_{317} = (11, 2, 0, 1)$ lies on line ℓ_2
7 : $P_{322} = (0, 3, 0, 1)$ lies on line ℓ_0
8 : $P_{332} = (10, 3, 0, 1)$ lies on line ℓ_1
9 : $P_{333} = (11, 3, 0, 1)$ lies on line ℓ_2
10 : $P_{338} = (0, 4, 0, 1)$ lies on line ℓ_0
11 : $P_{348} = (10, 4, 0, 1)$ lies on line ℓ_1
12 : $P_{349} = (11, 4, 0, 1)$ lies on line ℓ_2
13 : $P_{354} = (0, 5, 0, 1)$ lies on line ℓ_0
14 : $P_{364} = (10, 5, 0, 1)$ lies on line ℓ_1
15 : $P_{365} = (11, 5, 0, 1)$ lies on line ℓ_2
16 : $P_{370} = (0, 6, 0, 1)$ lies on line ℓ_0
17 : $P_{380} = (10, 6, 0, 1)$ lies on line ℓ_1
18 : $P_{381} = (11, 6, 0, 1)$ lies on line ℓ_2
19 : $P_{386} = (0, 7, 0, 1)$ lies on line ℓ_0
20 : $P_{396} = (10, 7, 0, 1)$ lies on line ℓ_1
21 : $P_{397} = (11, 7, 0, 1)$ lies on line ℓ_2
22 : $P_{402} = (0, 8, 0, 1)$ lies on line ℓ_0
23 : $P_{412} = (10, 8, 0, 1)$ lies on line ℓ_1
24 : $P_{413} = (11, 8, 0, 1)$ lies on line ℓ_2
25 : $P_{418} = (0, 9, 0, 1)$ lies on line ℓ_0
26 : $P_{428} = (10, 9, 0, 1)$ lies on line ℓ_1
27 : $P_{429} = (11, 9, 0, 1)$ lies on line ℓ_2
28 : $P_{434} = (0, 10, 0, 1)$ lies on line ℓ_0
29 : $P_{445} = (11, 10, 0, 1)$ lies on line ℓ_2
30 : $P_{450} = (0, 11, 0, 1)$ lies on line ℓ_0
31 : $P_{460} = (10, 11, 0, 1)$ lies on line ℓ_1
32 : $P_{466} = (0, 12, 0, 1)$ lies on line ℓ_0
33 : $P_{476} = (10, 12, 0, 1)$ lies on line ℓ_1
34 : $P_{477} = (11, 12, 0, 1)$ lies on line ℓ_2
35 : $P_{482} = (0, 13, 0, 1)$ lies on line ℓ_0
36 : $P_{492} = (10, 13, 0, 1)$ lies on line ℓ_1
37 : $P_{493} = (11, 13, 0, 1)$ lies on line ℓ_2
38 : $P_{498} = (0, 14, 0, 1)$ lies on line ℓ_0
39 : $P_{508} = (10, 14, 0, 1)$ lies on line ℓ_1
40 : $P_{509} = (11, 14, 0, 1)$ lies on line ℓ_2
41 : $P_{514} = (0, 15, 0, 1)$ lies on line ℓ_0
42 : $P_{524} = (10, 15, 0, 1)$ lies on line ℓ_1
43 : $P_{525} = (11, 15, 0, 1)$ lies on line ℓ_2
44 : $P_{530} = (0, 0, 1, 1)$ lies on line ℓ_3
45 : $P_{540} = (10, 0, 1, 1)$ lies on line ℓ_4
46 : $P_{541} = (11, 0, 1, 1)$ lies on line ℓ_5
47 : $P_{690} = (1, 10, 1, 1)$ lies on line ℓ_9
48 : $P_{699} = (10, 10, 1, 1)$ lies on line ℓ_6
49 : $P_{706} = (1, 11, 1, 1)$ lies on line ℓ_8
50 : $P_{716} = (11, 11, 1, 1)$ lies on line ℓ_7
51 : $P_{785} = (0, 0, 2, 1)$ lies on line ℓ_3
52 : $P_{795} = (10, 0, 2, 1)$ lies on line ℓ_4
53 : $P_{796} = (11, 0, 2, 1)$ lies on line ℓ_5
54 : $P_{955} = (10, 10, 2, 1)$ lies on line ℓ_6
55 : $P_{972} = (11, 11, 2, 1)$ lies on line ℓ_7
56 : $P_{979} = (2, 12, 2, 1)$ lies on line ℓ_8
57 : $P_{1011} = (2, 14, 2, 1)$ lies on line ℓ_9
58 : $P_{1041} = (0, 0, 3, 1)$ lies on line ℓ_3
59 : $P_{1051} = (10, 0, 3, 1)$ lies on line ℓ_4
60 : $P_{1052} = (11, 0, 3, 1)$ lies on line ℓ_5
61 : $P_{1124} = (3, 5, 3, 1)$ lies on line ℓ_9
62 : $P_{1140} = (3, 6, 3, 1)$ lies on line ℓ_8
63 : $P_{1211} = (10, 10, 3, 1)$ lies on line ℓ_6
64 : $P_{1228} = (11, 11, 3, 1)$ lies on line ℓ_7
65 : $P_{1297} = (0, 0, 4, 1)$ lies on line ℓ_3
66 : $P_{1307} = (10, 0, 4, 1)$ lies on line ℓ_4
67 : $P_{1308} = (11, 0, 4, 1)$ lies on line ℓ_5
68 : $P_{1333} = (4, 2, 4, 1)$ lies on line ℓ_8
69 : $P_{1397} = (4, 6, 4, 1)$ lies on line ℓ_9
70 : $P_{1467} = (10, 10, 4, 1)$ lies on line ℓ_6
71 : $P_{1484} = (11, 11, 4, 1)$ lies on line ℓ_7
72 : $P_{1553} = (0, 0, 5, 1)$ lies on line ℓ_3
73 : $P_{1563} = (10, 0, 5, 1)$ lies on line ℓ_4
74 : $P_{1564} = (11, 0, 5, 1)$ lies on line ℓ_5
75 : $P_{1686} = (5, 8, 5, 1)$ lies on line ℓ_8
76 : $P_{1723} = (10, 10, 5, 1)$ lies on line ℓ_6
77 : $P_{1740} = (11, 11, 5, 1)$ lies on line ℓ_7
78 : $P_{1766} = (5, 13, 5, 1)$ lies on line ℓ_9
79 : $P_{1809} = (0, 0, 6, 1)$ lies on line ℓ_3
80 : $P_{1819} = (10, 0, 6, 1)$ lies on line ℓ_4
81 : $P_{1820} = (11, 0, 6, 1)$ lies on line ℓ_5
82 : $P_{1959} = (6, 9, 6, 1)$ lies on line ℓ_9
83 : $P_{1979} = (10, 10, 6, 1)$ lies on line ℓ_6
84 : $P_{1996} = (11, 11, 6, 1)$ lies on line ℓ_7
85 : $P_{2055} = (6, 15, 6, 1)$ lies on line ℓ_8
86 : $P_{2065} = (0, 0, 7, 1)$ lies on line ℓ_3
87 : $P_{2075} = (10, 0, 7, 1)$ lies on line ℓ_4
88 : $P_{2076} = (11, 0, 7, 1)$ lies on line ℓ_5
89 : $P_{2104} = (7, 2, 7, 1)$ lies on line ℓ_9
90 : $P_{2152} = (7, 5, 7, 1)$ lies on line ℓ_8
91 : $P_{2235} = (10, 10, 7, 1)$ lies on line ℓ_6
92 : $P_{2252} = (11, 11, 7, 1)$ lies on line ℓ_7
93 : $P_{2321} = (0, 0, 8, 1)$ lies on line ℓ_3
94 : $P_{2331} = (10, 0, 8, 1)$ lies on line ℓ_4
95 : $P_{2332} = (11, 0, 8, 1)$ lies on line ℓ_5
96 : $P_{2441} = (8, 7, 8, 1)$ lies on line ℓ_8
97 : $P_{2491} = (10, 10, 8, 1)$ lies on line ℓ_6
98 : $P_{2508} = (11, 11, 8, 1)$ lies on line ℓ_7
99 : $P_{2569} = (8, 15, 8, 1)$ lies on line ℓ_9
100 : $P_{2577} = (0, 0, 9, 1)$ lies on line ℓ_3
101 : $P_{2587} = (10, 0, 9, 1)$ lies on line ℓ_4
102 : $P_{2588} = (11, 0, 9, 1)$ lies on line ℓ_5
103 : $P_{2650} = (9, 4, 9, 1)$ lies on line ℓ_9
104 : $P_{2747} = (10, 10, 9, 1)$ lies on line ℓ_6
105 : $P_{2764} = (11, 11, 9, 1)$ lies on line ℓ_7
106 : $P_{2794} = (9, 13, 9, 1)$ lies on line ℓ_8
107 : $P_{2833} = (0, 0, 10, 1)$ lies on line ℓ_3

108 : $P_{2844} = (11, 0, 10, 1)$ lies on line ℓ_5
109 : $P_{3020} = (11, 11, 10, 1)$ lies on line ℓ_7
110 : $P_{3089} = (0, 0, 11, 1)$ lies on line ℓ_3
111 : $P_{3099} = (10, 0, 11, 1)$ lies on line ℓ_4
112 : $P_{3259} = (10, 10, 11, 1)$ lies on line ℓ_6
113 : $P_{3345} = (0, 0, 12, 1)$ lies on line ℓ_3
114 : $P_{3355} = (10, 0, 12, 1)$ lies on line ℓ_4
115 : $P_{3356} = (11, 0, 12, 1)$ lies on line ℓ_5
116 : $P_{3421} = (12, 4, 12, 1)$ lies on line ℓ_8
117 : $P_{3485} = (12, 8, 12, 1)$ lies on line ℓ_9
118 : $P_{3515} = (10, 10, 12, 1)$ lies on line ℓ_6
119 : $P_{3532} = (11, 11, 12, 1)$ lies on line ℓ_7
120 : $P_{3601} = (0, 0, 13, 1)$ lies on line ℓ_3
121 : $P_{3611} = (10, 0, 13, 1)$ lies on line ℓ_4
122 : $P_{3612} = (11, 0, 13, 1)$ lies on line ℓ_5
123 : $P_{3662} = (13, 3, 13, 1)$ lies on line ℓ_9
124 : $P_{3771} = (10, 10, 13, 1)$ lies on line ℓ_6
125 : $P_{3788} = (11, 11, 13, 1)$ lies on line ℓ_7
126 : $P_{3838} = (13, 14, 13, 1)$ lies on line ℓ_8
127 : $P_{3857} = (0, 0, 14, 1)$ lies on line ℓ_3
128 : $P_{3867} = (10, 0, 14, 1)$ lies on line ℓ_4
129 : $P_{3868} = (11, 0, 14, 1)$ lies on line ℓ_5
130 : $P_{3983} = (14, 7, 14, 1)$ lies on line ℓ_9
131 : $P_{4015} = (14, 9, 14, 1)$ lies on line ℓ_8
132 : $P_{4027} = (10, 10, 14, 1)$ lies on line ℓ_6
133 : $P_{4044} = (11, 11, 14, 1)$ lies on line ℓ_7
134 : $P_{4113} = (0, 0, 15, 1)$ lies on line ℓ_3
135 : $P_{4123} = (10, 0, 15, 1)$ lies on line ℓ_4
136 : $P_{4124} = (11, 0, 15, 1)$ lies on line ℓ_5
137 : $P_{4176} = (15, 3, 15, 1)$ lies on line ℓ_8
138 : $P_{4283} = (10, 10, 15, 1)$ lies on line ℓ_6
139 : $P_{4300} = (11, 11, 15, 1)$ lies on line ℓ_7
140 : $P_{4320} = (15, 12, 15, 1)$ lies on line ℓ_9

The single points on the surface are:

Points on surface but on no line

The surface has 168 points not on any line:
The points on the surface but not on lines are:

0 : $P_{78} = (11, 3, 1, 0)$
1 : $P_{109} = (10, 5, 1, 0)$
2 : $P_{128} = (13, 6, 1, 0)$
3 : $P_{143} = (12, 7, 1, 0)$
4 : $P_{158} = (11, 8, 1, 0)$
5 : $P_{185} = (6, 10, 1, 0)$
6 : $P_{186} = (7, 10, 1, 0)$
7 : $P_{207} = (12, 11, 1, 0)$
8 : $P_{208} = (13, 11, 1, 0)$
9 : $P_{217} = (6, 12, 1, 0)$
10 : $P_{234} = (7, 13, 1, 0)$
11 : $P_{269} = (10, 15, 1, 0)$
12 : $P_{566} = (5, 2, 1, 1)$
13 : $P_{601} = (8, 4, 1, 1)$
14 : $P_{640} = (15, 6, 1, 1)$
15 : $P_{646} = (5, 7, 1, 1)$
16 : $P_{688} = (15, 9, 1, 1)$
17 : $P_{729} = (8, 12, 1, 1)$
18 : $P_{740} = (3, 13, 1, 1)$
19 : $P_{756} = (3, 14, 1, 1)$
20 : $P_{807} = (6, 1, 2, 1)$
21 : $P_{845} = (12, 3, 2, 1)$
22 : $P_{903} = (6, 7, 2, 1)$
23 : $P_{933} = (4, 9, 2, 1)$
24 : $P_{997} = (4, 13, 2, 1)$
25 : $P_{1010} = (1, 14, 2, 1)$
26 : $P_{1026} = (1, 15, 2, 1)$
27 : $P_{1037} = (12, 15, 2, 1)$
28 : $P_{1065} = (8, 1, 3, 1)$
29 : $P_{1093} = (4, 3, 3, 1)$
30 : $P_{1157} = (4, 7, 3, 1)$
31 : $P_{1175} = (6, 8, 3, 1)$
32 : $P_{1193} = (8, 9, 3, 1)$
33 : $P_{1271} = (6, 14, 3, 1)$
34 : $P_{1326} = (13, 1, 4, 1)$
35 : $P_{1330} = (1, 2, 4, 1)$
36 : $P_{1346} = (1, 3, 4, 1)$
37 : $P_{1351} = (6, 3, 4, 1)$
38 : $P_{1383} = (6, 5, 4, 1)$
39 : $P_{1418} = (9, 7, 4, 1)$
40 : $P_{1502} = (13, 12, 4, 1)$
41 : $P_{1530} = (9, 14, 4, 1)$
42 : $P_{1584} = (15, 1, 5, 1)$
43 : $P_{1598} = (13, 2, 5, 1)$
44 : $P_{1642} = (9, 5, 5, 1)$
45 : $P_{1754} = (9, 12, 5, 1)$
46 : $P_{1792} = (15, 14, 5, 1)$
47 : $P_{1806} = (13, 15, 5, 1)$
48 : $P_{1839} = (14, 1, 6, 1)$
49 : $P_{1862} = (5, 3, 6, 1)$
50 : $P_{1904} = (15, 5, 6, 1)$
51 : $P_{1910} = (5, 6, 6, 1)$
52 : $P_{1914} = (9, 6, 6, 1)$
53 : $P_{1918} = (13, 6, 6, 1)$

$54: P_{1973} = (4, 10, 6, 1)$
$55: P_{1984} = (15, 10, 6, 1)$
$56: P_{1992} = (7, 11, 6, 1)$
$57: P_{1998} = (13, 11, 6, 1)$
$58: P_{2008} = (7, 12, 6, 1)$
$59: P_{2037} = (4, 14, 6, 1)$
$60: P_{2058} = (9, 15, 6, 1)$
$61: P_{2063} = (14, 15, 6, 1)$
$62: P_{2085} = (4, 1, 7, 1)$
$63: P_{2143} = (14, 4, 7, 1)$
$64: P_{2147} = (2, 5, 7, 1)$
$65: P_{2149} = (4, 5, 7, 1)$
$66: P_{2179} = (2, 7, 7, 1)$
$67: P_{2189} = (12, 7, 7, 1)$
$68: P_{2192} = (15, 7, 7, 1)$
$69: P_{2208} = (15, 8, 7, 1)$
$70: P_{2230} = (5, 10, 7, 1)$
$71: P_{2239} = (14, 10, 7, 1)$
$72: P_{2247} = (6, 11, 7, 1)$
$73: P_{2253} = (12, 11, 7, 1)$
$74: P_{2279} = (6, 13, 7, 1)$
$75: P_{2310} = (5, 15, 7, 1)$
$76: P_{2340} = (3, 1, 8, 1)$
$77: P_{2356} = (3, 2, 8, 1)$
$78: P_{2376} = (7, 3, 8, 1)$
$79: P_{2392} = (7, 4, 8, 1)$
$80: P_{2431} = (14, 6, 8, 1)$
$81: P_{2463} = (14, 8, 8, 1)$
$82: P_{2600} = (7, 1, 9, 1)$
$83: P_{2623} = (14, 2, 9, 1)$
$84: P_{2642} = (1, 4, 9, 1)$
$85: P_{2658} = (1, 5, 9, 1)$
$86: P_{2670} = (13, 5, 9, 1)$
$87: P_{2680} = (7, 6, 9, 1)$
$88: P_{2718} = (13, 8, 9, 1)$
$89: P_{2783} = (14, 12, 9, 1)$
$90: P_{2877} = (12, 2, 10, 1)$
$91: P_{2890} = (9, 3, 10, 1)$
$92: P_{2900} = (3, 4, 10, 1)$
$93: P_{2910} = (13, 4, 10, 1)$
$94: P_{2912} = (15, 4, 10, 1)$
$95: P_{2930} = (1, 6, 10, 1)$
$96: P_{2937} = (8, 6, 10, 1)$
$97: P_{2946} = (1, 7, 10, 1)$
$98: P_{2948} = (3, 7, 10, 1)$
$99: P_{2963} = (2, 8, 10, 1)$
$100: P_{2990} = (13, 9, 10, 1)$
$101: P_{2995} = (2, 10, 10, 1)$
$102: P_{3002} = (9, 10, 10, 1)$
$103: P_{3014} = (5, 11, 10, 1)$
$104: P_{3024} = (15, 11, 10, 1)$
$105: P_{3062} = (5, 14, 10, 1)$
$106: P_{3065} = (8, 14, 10, 1)$
$107: P_{3069} = (12, 14, 10, 1)$
$108: P_{3127} = (6, 2, 11, 1)$
$109: P_{3129} = (8, 2, 11, 1)$
$110: P_{3136} = (15, 2, 11, 1)$
$111: P_{3159} = (6, 4, 11, 1)$
$112: P_{3183} = (14, 5, 11, 1)$
$113: P_{3236} = (3, 9, 11, 1)$
$114: P_{3238} = (5, 9, 11, 1)$
$115: P_{3240} = (7, 9, 11, 1)$
$116: P_{3252} = (3, 10, 11, 1)$
$117: P_{3257} = (8, 10, 11, 1)$
$118: P_{3269} = (4, 11, 11, 1)$
$119: P_{3279} = (14, 11, 11, 1)$
$120: P_{3282} = (1, 12, 11, 1)$
$121: P_{3286} = (5, 12, 11, 1)$
$122: P_{3298} = (1, 13, 11, 1)$
$123: P_{3312} = (15, 13, 11, 1)$
$124: P_{3320} = (7, 14, 11, 1)$
$125: P_{3333} = (4, 15, 11, 1)$
$126: P_{3370} = (9, 1, 12, 1)$
$127: P_{3401} = (8, 3, 12, 1)$
$128: P_{3470} = (13, 7, 12, 1)$
$129: P_{3477} = (4, 8, 12, 1)$
$130: P_{3482} = (9, 8, 12, 1)$
$131: P_{3491} = (2, 9, 12, 1)$
$132: P_{3511} = (6, 10, 12, 1)$
$133: P_{3518} = (13, 10, 12, 1)$
$134: P_{3523} = (2, 11, 12, 1)$
$135: P_{3529} = (8, 11, 12, 1)$
$136: P_{3540} = (3, 12, 12, 1)$
$137: P_{3541} = (4, 12, 12, 1)$
$138: P_{3543} = (6, 12, 12, 1)$
$139: P_{3588} = (3, 15, 12, 1)$
$140: P_{3619} = (2, 1, 13, 1)$
$141: P_{3642} = (9, 2, 13, 1)$
$142: P_{3651} = (2, 3, 13, 1)$
$143: P_{3663} = (14, 3, 13, 1)$
$144: P_{3689} = (8, 5, 13, 1)$
$145: P_{3709} = (12, 6, 13, 1)$
$146: P_{3732} = (3, 8, 13, 1)$
$147: P_{3768} = (7, 10, 13, 1)$
$148: P_{3773} = (12, 10, 13, 1)$
$149: P_{3780} = (3, 11, 13, 1)$
$150: P_{3786} = (9, 11, 13, 1)$
$151: P_{3816} = (7, 13, 13, 1)$
$152: P_{3817} = (8, 13, 13, 1)$
$153: P_{3823} = (14, 13, 13, 1)$
$154: P_{3885} = (12, 1, 14, 1)$
$155: P_{3923} = (2, 4, 14, 1)$
$156: P_{3955} = (2, 6, 14, 1)$
$157: P_{3986} = (1, 8, 14, 1)$
$158: P_{3992} = (7, 8, 14, 1)$
$159: P_{4002} = (1, 9, 14, 1)$
$160: P_{4077} = (12, 13, 14, 1)$
$161: P_{4104} = (7, 15, 14, 1)$

$162: P_{4134} = (5, 1, 15, 1)$
$163: P_{4182} = (5, 4, 15, 1)$
$164: P_{4205} = (12, 5, 15, 1)$
$165: P_{4269} = (12, 9, 15, 1)$
$166: P_{4323} = (2, 13, 15, 1)$
$167: P_{4355} = (2, 15, 15, 1)$

Line Intersection Graph

	0 1 2 3 4 5 6 7 8 9
0	0 1 1 1 0 0 0 0 1 1
1	1 0 1 0 1 0 1 0 0 0
2	1 1 0 0 0 1 0 1 0 0
3	1 0 0 0 1 1 1 1 0 0
4	0 1 0 1 0 1 1 1 0 1
5	0 0 1 1 1 0 1 1 1 0
6	0 1 0 1 1 1 0 1 1 0
7	0 0 1 1 1 1 1 0 0 1
8	1 0 0 0 0 1 1 0 0 1
9	1 0 0 0 1 0 0 1 1 0

Neighbor sets in the line intersection graph:
Line 0 intersects

Line	ℓ_1	ℓ_2	ℓ_3	ℓ_8	ℓ_9
in point	P_1	P_1	P_3	P_{290}	P_{290}

Line 1 intersects

Line	ℓ_0	ℓ_2	ℓ_4	ℓ_6
in point	P_1	P_1	P_{284}	P_{444}

Line 2 intersects

Line	ℓ_0	ℓ_1	ℓ_5	ℓ_7
in point	P_1	P_1	P_{285}	P_{461}

Line 3 intersects

Line	ℓ_0	ℓ_4	ℓ_5	ℓ_6	ℓ_7
in point	P_3	P_2	P_2	P_2	P_2

Line 4 intersects

Line	ℓ_1	ℓ_3	ℓ_5	ℓ_6	ℓ_7	ℓ_9
in point	P_{284}	P_2	P_2	P_2	P_2	P_{2843}

Line 5 intersects

Line	ℓ_2	ℓ_3	ℓ_4	ℓ_6	ℓ_7	ℓ_8
in point	P_{285}	P_2	P_2	P_2	P_2	P_{3100}

Line 6 intersects

Line	ℓ_1	ℓ_3	ℓ_4	ℓ_5	ℓ_7	ℓ_8
in point	P_{444}	P_2	P_2	P_2	P_2	P_{3003}

Line 7 intersects

Line	ℓ_2	ℓ_3	ℓ_4	ℓ_5	ℓ_6	ℓ_9
in point	P_{461}	P_2	P_2	P_2	P_2	P_{3276}

Line 8 intersects

Line	ℓ_0	ℓ_5	ℓ_6	ℓ_9
in point	P_{290}	P_{3100}	P_{3003}	P_{290}

Line 9 intersects

Line	ℓ_0	ℓ_4	ℓ_7	ℓ_8
in point	P_{290}	P_{2843}	P_{3276}	P_{290}

The surface has 321 points:
The points on the surface are:

$0:\ P_{1} = (0,1,0,0)$
$1:\ P_{2} = (0,0,1,0)$
$2:\ P_{3} = (0,0,0,1)$
$3:\ P_{78} = (11,3,1,0)$
$4:\ P_{109} = (10,5,1,0)$
$5:\ P_{128} = (13,6,1,0)$
$6:\ P_{143} = (12,7,1,0)$
$7:\ P_{158} = (11,8,1,0)$
$8:\ P_{180} = (1,10,1,0)$
$9:\ P_{185} = (6,10,1,0)$
$10:\ P_{186} = (7,10,1,0)$
$11:\ P_{196} = (1,11,1,0)$
$12:\ P_{207} = (12,11,1,0)$
$13:\ P_{208} = (13,11,1,0)$
$14:\ P_{217} = (6,12,1,0)$
$15:\ P_{234} = (7,13,1,0)$
$16:\ P_{269} = (10,15,1,0)$
$17:\ P_{284} = (10,0,0,1)$
$18:\ P_{285} = (11,0,0,1)$
$19:\ P_{290} = (0,1,0,1)$
$20:\ P_{300} = (10,1,0,1)$
$21:\ P_{301} = (11,1,0,1)$
$22:\ P_{306} = (0,2,0,1)$
$23:\ P_{316} = (10,2,0,1)$
$24:\ P_{317} = (11,2,0,1)$
$25:\ P_{322} = (0,3,0,1)$
$26:\ P_{332} = (10,3,0,1)$
$27:\ P_{333} = (11,3,0,1)$
$28:\ P_{338} = (0,4,0,1)$
$29:\ P_{348} = (10,4,0,1)$
$30:\ P_{349} = (11,4,0,1)$
$31:\ P_{354} = (0,5,0,1)$
$32:\ P_{364} = (10,5,0,1)$
$33:\ P_{365} = (11,5,0,1)$
$34:\ P_{370} = (0,6,0,1)$
$35:\ P_{380} = (10,6,0,1)$
$36:\ P_{381} = (11,6,0,1)$
$37:\ P_{386} = (0,7,0,1)$
$38:\ P_{396} = (10,7,0,1)$
$39:\ P_{397} = (11,7,0,1)$
$40:\ P_{402} = (0,8,0,1)$
$41:\ P_{412} = (10,8,0,1)$
$42:\ P_{413} = (11,8,0,1)$
$43:\ P_{418} = (0,9,0,1)$
$44:\ P_{428} = (10,9,0,1)$
$45:\ P_{429} = (11,9,0,1)$
$46:\ P_{434} = (0,10,0,1)$
$47:\ P_{444} = (10,10,0,1)$
$48:\ P_{445} = (11,10,0,1)$
$49:\ P_{450} = (0,11,0,1)$
$50:\ P_{460} = (10,11,0,1)$
$51:\ P_{461} = (11,11,0,1)$
$52:\ P_{466} = (0,12,0,1)$
$53:\ P_{476} = (10,12,0,1)$
$54:\ P_{477} = (11,12,0,1)$
$55:\ P_{482} = (0,13,0,1)$
$56:\ P_{492} = (10,13,0,1)$
$57:\ P_{493} = (11,13,0,1)$
$58:\ P_{498} = (0,14,0,1)$
$59:\ P_{508} = (10,14,0,1)$
$60:\ P_{509} = (11,14,0,1)$
$61:\ P_{514} = (0,15,0,1)$
$62:\ P_{524} = (10,15,0,1)$
$63:\ P_{525} = (11,15,0,1)$
$64:\ P_{530} = (0,0,1,1)$
$65:\ P_{540} = (10,0,1,1)$
$66:\ P_{541} = (11,0,1,1)$
$67:\ P_{566} = (5,2,1,1)$
$68:\ P_{601} = (8,4,1,1)$
$69:\ P_{640} = (15,6,1,1)$
$70:\ P_{646} = (5,7,1,1)$
$71:\ P_{688} = (15,9,1,1)$
$72:\ P_{690} = (1,10,1,1)$
$73:\ P_{699} = (10,10,1,1)$
$74:\ P_{706} = (1,11,1,1)$
$75:\ P_{716} = (11,11,1,1)$
$76:\ P_{729} = (8,12,1,1)$
$77:\ P_{740} = (3,13,1,1)$
$78:\ P_{756} = (3,14,1,1)$
$79:\ P_{785} = (0,0,2,1)$
$80:\ P_{795} = (10,0,2,1)$
$81:\ P_{796} = (11,0,2,1)$
$82:\ P_{807} = (6,1,2,1)$
$83:\ P_{845} = (12,3,2,1)$
$84:\ P_{903} = (6,7,2,1)$
$85:\ P_{933} = (4,9,2,1)$
$86:\ P_{955} = (10,10,2,1)$
$87:\ P_{972} = (11,11,2,1)$
$88:\ P_{979} = (2,12,2,1)$
$89:\ P_{997} = (4,13,2,1)$
$90:\ P_{1010} = (1,14,2,1)$
$91:\ P_{1011} = (2,14,2,1)$
$92:\ P_{1026} = (1,15,2,1)$
$93:\ P_{1037} = (12,15,2,1)$
$94:\ P_{1041} = (0,0,3,1)$
$95:\ P_{1051} = (10,0,3,1)$
$96:\ P_{1052} = (11,0,3,1)$
$97:\ P_{1065} = (8,1,3,1)$
$98:\ P_{1093} = (4,3,3,1)$
$99:\ P_{1124} = (3,5,3,1)$
$100:\ P_{1140} = (3,6,3,1)$
$101:\ P_{1157} = (4,7,3,1)$
$102:\ P_{1175} = (6,8,3,1)$
$103:\ P_{1193} = (8,9,3,1)$
$104:\ P_{1211} = (10,10,3,1)$
$105:\ P_{1228} = (11,11,3,1)$
$106:\ P_{1271} = (6,14,3,1)$
$107:\ P_{1297} = (0,0,4,1)$
$108:\ P_{1307} = (10,0,4,1)$
$109:\ P_{1308} = (11,0,4,1)$
$110:\ P_{1326} = (13,1,4,1)$
$111:\ P_{1330} = (1,2,4,1)$
$112:\ P_{1333} = (4,2,4,1)$
$113:\ P_{1346} = (1,3,4,1)$
$114:\ P_{1351} = (6,3,4,1)$
$115:\ P_{1383} = (6,5,4,1)$
$116:\ P_{1397} = (4,6,4,1)$
$117:\ P_{1418} = (9,7,4,1)$
$118:\ P_{1467} = (10,10,4,1)$
$119:\ P_{1484} = (11,11,4,1)$
$120:\ P_{1502} = (13,12,4,1)$
$121:\ P_{1530} = (9,14,4,1)$
$122:\ P_{1553} = (0,0,5,1)$
$123:\ P_{1563} = (10,0,5,1)$
$124:\ P_{1564} = (11,0,5,1)$
$125:\ P_{1584} = (15,1,5,1)$
$126:\ P_{1598} = (13,2,5,1)$
$127:\ P_{1642} = (9,5,5,1)$
$128:\ P_{1686} = (5,8,5,1)$
$129:\ P_{1723} = (10,10,5,1)$
$130:\ P_{1740} = (11,11,5,1)$
$131:\ P_{1754} = (9,12,5,1)$
$132:\ P_{1766} = (5,13,5,1)$
$133:\ P_{1792} = (15,14,5,1)$
$134:\ P_{1806} = (13,15,5,1)$
$135:\ P_{1809} = (0,0,6,1)$
$136:\ P_{1819} = (10,0,6,1)$
$137:\ P_{1820} = (11,0,6,1)$
$138:\ P_{1839} = (14,1,6,1)$
$139:\ P_{1862} = (5,3,6,1)$
$140:\ P_{1904} = (15,5,6,1)$
$141:\ P_{1910} = (5,6,6,1)$
$142:\ P_{1914} = (9,6,6,1)$
$143:\ P_{1918} = (13,6,6,1)$
$144:\ P_{1959} = (6,9,6,1)$
$145:\ P_{1973} = (4,10,6,1)$
$146:\ P_{1979} = (10,10,6,1)$
$147:\ P_{1984} = (15,10,6,1)$
$148:\ P_{1992} = (7,11,6,1)$
$149:\ P_{1996} = (11,11,6,1)$
$150:\ P_{1998} = (13,11,6,1)$
$151:\ P_{2008} = (7,12,6,1)$
$152:\ P_{2037} = (4,14,6,1)$
$153:\ P_{2055} = (6,15,6,1)$
$154:\ P_{2058} = (9,15,6,1)$
$155:\ P_{2063} = (14,15,6,1)$
$156:\ P_{2065} = (0,0,7,1)$
$157:\ P_{2075} = (10,0,7,1)$
$158:\ P_{2076} = (11,0,7,1)$
$159:\ P_{2085} = (4,1,7,1)$
$160:\ P_{2104} = (7,2,7,1)$
$161:\ P_{2143} = (14,4,7,1)$

$162: P_{2147} = (2, 5, 7, 1)$
$163: P_{2149} = (4, 5, 7, 1)$
$164: P_{2152} = (7, 5, 7, 1)$
$165: P_{2179} = (2, 7, 7, 1)$
$166: P_{2189} = (12, 7, 7, 1)$
$167: P_{2192} = (15, 7, 7, 1)$
$168: P_{2208} = (15, 8, 7, 1)$
$169: P_{2230} = (5, 10, 7, 1)$
$170: P_{2235} = (10, 10, 7, 1)$
$171: P_{2239} = (14, 10, 7, 1)$
$172: P_{2247} = (6, 11, 7, 1)$
$173: P_{2252} = (11, 11, 7, 1)$
$174: P_{2253} = (12, 11, 7, 1)$
$175: P_{2279} = (6, 13, 7, 1)$
$176: P_{2310} = (5, 15, 7, 1)$
$177: P_{2321} = (0, 0, 8, 1)$
$178: P_{2331} = (10, 0, 8, 1)$
$179: P_{2332} = (11, 0, 8, 1)$
$180: P_{2340} = (3, 1, 8, 1)$
$181: P_{2356} = (3, 2, 8, 1)$
$182: P_{2376} = (7, 3, 8, 1)$
$183: P_{2392} = (7, 4, 8, 1)$
$184: P_{2431} = (14, 6, 8, 1)$
$185: P_{2441} = (8, 7, 8, 1)$
$186: P_{2463} = (14, 8, 8, 1)$
$187: P_{2491} = (10, 10, 8, 1)$
$188: P_{2508} = (11, 11, 8, 1)$
$189: P_{2569} = (8, 15, 8, 1)$
$190: P_{2577} = (0, 0, 9, 1)$
$191: P_{2587} = (10, 0, 9, 1)$
$192: P_{2588} = (11, 0, 9, 1)$
$193: P_{2600} = (7, 1, 9, 1)$
$194: P_{2623} = (14, 2, 9, 1)$
$195: P_{2642} = (1, 4, 9, 1)$
$196: P_{2650} = (9, 4, 9, 1)$
$197: P_{2658} = (1, 5, 9, 1)$
$198: P_{2670} = (13, 5, 9, 1)$
$199: P_{2680} = (7, 6, 9, 1)$
$200: P_{2718} = (13, 8, 9, 1)$
$201: P_{2747} = (10, 10, 9, 1)$
$202: P_{2764} = (11, 11, 9, 1)$
$203: P_{2783} = (14, 12, 9, 1)$
$204: P_{2794} = (9, 13, 9, 1)$
$205: P_{2833} = (0, 0, 10, 1)$
$206: P_{2843} = (10, 0, 10, 1)$
$207: P_{2844} = (11, 0, 10, 1)$
$208: P_{2877} = (12, 2, 10, 1)$
$209: P_{2890} = (9, 3, 10, 1)$
$210: P_{2900} = (3, 4, 10, 1)$
$211: P_{2910} = (13, 4, 10, 1)$
$212: P_{2912} = (15, 4, 10, 1)$
$213: P_{2930} = (1, 6, 10, 1)$
$214: P_{2937} = (8, 6, 10, 1)$
$215: P_{2946} = (1, 7, 10, 1)$
$216: P_{2948} = (3, 7, 10, 1)$
$217: P_{2963} = (2, 8, 10, 1)$
$218: P_{2990} = (13, 9, 10, 1)$
$219: P_{2995} = (2, 10, 10, 1)$
$220: P_{3002} = (9, 10, 10, 1)$
$221: P_{3003} = (10, 10, 10, 1)$
$222: P_{3014} = (5, 11, 10, 1)$
$223: P_{3020} = (11, 11, 10, 1)$
$224: P_{3024} = (15, 11, 10, 1)$
$225: P_{3062} = (5, 14, 10, 1)$
$226: P_{3065} = (8, 14, 10, 1)$
$227: P_{3069} = (12, 14, 10, 1)$
$228: P_{3089} = (0, 0, 11, 1)$
$229: P_{3099} = (10, 0, 11, 1)$
$230: P_{3100} = (11, 0, 11, 1)$
$231: P_{3127} = (6, 2, 11, 1)$
$232: P_{3129} = (8, 2, 11, 1)$
$233: P_{3136} = (15, 2, 11, 1)$
$234: P_{3159} = (6, 4, 11, 1)$
$235: P_{3183} = (14, 5, 11, 1)$
$236: P_{3236} = (3, 9, 11, 1)$
$237: P_{3238} = (5, 9, 11, 1)$
$238: P_{3240} = (7, 9, 11, 1)$
$239: P_{3252} = (3, 10, 11, 1)$
$240: P_{3257} = (8, 10, 11, 1)$
$241: P_{3259} = (10, 10, 11, 1)$
$242: P_{3269} = (4, 11, 11, 1)$
$243: P_{3276} = (11, 11, 11, 1)$
$244: P_{3279} = (14, 11, 11, 1)$
$245: P_{3282} = (1, 12, 11, 1)$
$246: P_{3286} = (5, 12, 11, 1)$
$247: P_{3298} = (1, 13, 11, 1)$
$248: P_{3312} = (15, 13, 11, 1)$
$249: P_{3320} = (7, 14, 11, 1)$
$250: P_{3333} = (4, 15, 11, 1)$
$251: P_{3345} = (0, 0, 12, 1)$
$252: P_{3355} = (10, 0, 12, 1)$
$253: P_{3356} = (11, 0, 12, 1)$
$254: P_{3370} = (9, 1, 12, 1)$
$255: P_{3401} = (8, 3, 12, 1)$
$256: P_{3421} = (12, 4, 12, 1)$
$257: P_{3470} = (13, 7, 12, 1)$
$258: P_{3477} = (4, 8, 12, 1)$
$259: P_{3482} = (9, 8, 12, 1)$
$260: P_{3485} = (12, 8, 12, 1)$
$261: P_{3491} = (2, 9, 12, 1)$
$262: P_{3511} = (6, 10, 12, 1)$
$263: P_{3515} = (10, 10, 12, 1)$
$264: P_{3518} = (13, 10, 12, 1)$
$265: P_{3523} = (2, 11, 12, 1)$
$266: P_{3529} = (8, 11, 12, 1)$
$267: P_{3532} = (11, 11, 12, 1)$
$268: P_{3540} = (3, 12, 12, 1)$
$269: P_{3541} = (4, 12, 12, 1)$
$270: P_{3543} = (6, 12, 12, 1)$
$271: P_{3588} = (3, 15, 12, 1)$
$272: P_{3601} = (0, 0, 13, 1)$
$273: P_{3611} = (10, 0, 13, 1)$
$274: P_{3612} = (11, 0, 13, 1)$
$275: P_{3619} = (2, 1, 13, 1)$
$276: P_{3642} = (9, 2, 13, 1)$
$277: P_{3651} = (2, 3, 13, 1)$
$278: P_{3662} = (13, 3, 13, 1)$
$279: P_{3663} = (14, 3, 13, 1)$
$280: P_{3689} = (8, 5, 13, 1)$
$281: P_{3709} = (12, 6, 13, 1)$
$282: P_{3732} = (3, 8, 13, 1)$
$283: P_{3768} = (7, 10, 13, 1)$
$284: P_{3771} = (10, 10, 13, 1)$
$285: P_{3773} = (12, 10, 13, 1)$
$286: P_{3780} = (3, 11, 13, 1)$
$287: P_{3786} = (9, 11, 13, 1)$
$288: P_{3788} = (11, 11, 13, 1)$
$289: P_{3816} = (7, 13, 13, 1)$
$290: P_{3817} = (8, 13, 13, 1)$
$291: P_{3823} = (14, 13, 13, 1)$
$292: P_{3838} = (13, 14, 13, 1)$
$293: P_{3857} = (0, 0, 14, 1)$
$294: P_{3867} = (10, 0, 14, 1)$
$295: P_{3868} = (11, 0, 14, 1)$
$296: P_{3885} = (12, 1, 14, 1)$
$297: P_{3923} = (2, 4, 14, 1)$
$298: P_{3955} = (2, 6, 14, 1)$
$299: P_{3983} = (14, 7, 14, 1)$
$300: P_{3986} = (1, 8, 14, 1)$
$301: P_{3992} = (7, 8, 14, 1)$
$302: P_{4002} = (1, 9, 14, 1)$
$303: P_{4015} = (14, 9, 14, 1)$
$304: P_{4027} = (10, 10, 14, 1)$
$305: P_{4044} = (11, 11, 14, 1)$
$306: P_{4077} = (12, 13, 14, 1)$
$307: P_{4104} = (7, 15, 14, 1)$
$308: P_{4113} = (0, 0, 15, 1)$
$309: P_{4123} = (10, 0, 15, 1)$
$310: P_{4124} = (11, 0, 15, 1)$
$311: P_{4134} = (5, 1, 15, 1)$
$312: P_{4176} = (15, 3, 15, 1)$
$313: P_{4182} = (5, 4, 15, 1)$
$314: P_{4205} = (12, 5, 15, 1)$
$315: P_{4269} = (12, 9, 15, 1)$
$316: P_{4283} = (10, 10, 15, 1)$
$317: P_{4300} = (11, 11, 15, 1)$
$318: P_{4320} = (15, 12, 15, 1)$
$319: P_{4323} = (2, 13, 15, 1)$
$320: P_{4355} = (2, 15, 15, 1)$