Rank-65839 over GF(16)

January 15, 2021

The equation

The equation of the surface is :

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

(0, 0, 1, 1, 0, 1, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0)
The point rank of the equation over GF(16) is 287384085

General information

Number of lines	7
Number of points	305
Number of singular points	2
Number of Eckardt points	0
Number of double points	3
Number of single points	105
Number of points off lines	195
Number of Hesse planes	0
Number of axes	0
Type of points on lines	17^7
Type of lines on points	4^2, 2^3, 1^{105}, 0^{195}

Singular Points

The surface has 2 singular points:

$0: \ P_{14} = \mathbf{P}(\delta^{10}, 1, 0, 0) = \mathbf{P}(10, 1, 0, 0)$
$1: \ P_{15} = \mathbf{P}(\delta^{5}, 1, 0, 0) = \mathbf{P}(11, 1, 0, 0)$

The 7 Lines

The lines and their Pluecker coordinates are:

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

$$\ell_1 = \left[\begin{array}{cccc} 1 & \delta^5 & 0 & 0 \\ 0 & 0 & 1 & 1 \end{array}\right]_{3260} = \left[\begin{array}{cccc} 1 & 11 & 0 & 0 \\ 0 & 0 & 1 & 1 \end{array}\right]_{3260} = \mathbf{Pl}(0,0,1,1,10,1)_{46146}$$

$$\ell_2 = \left[\begin{array}{cccc} 1 & \delta^5 & 0 & 0 \\ 0 & 0 & 1 & \delta^5 \end{array}\right]_{3270} = \left[\begin{array}{cccc} 1 & 11 & 0 & 0 \\ 0 & 0 & 1 & 11 \end{array}\right]_{3270} = \mathbf{Pl}(0,0,10,11,1,1)_{9705}$$

$$\ell_3 = \left[\begin{array}{cccc} 1 & \delta^5 & 0 & 0 \\ 0 & 0 & 1 & \delta^{10} \end{array}\right]_{3269} = \left[\begin{array}{cccc} 1 & 11 & 0 & 0 \\ 0 & 0 & 1 & 10 \end{array}\right]_{3269} = \mathbf{Pl}(0,0,11,10,11,1)_{50536}$$

$$\ell_4 = \left[\begin{array}{cccc} 1 & \delta^{10} & 0 & 0 \\ 0 & 0 & 1 & 1 \end{array}\right]_{2987} = \left[\begin{array}{cccc} 1 & 10 & 0 & 0 \\ 0 & 0 & 1 & 1 \end{array}\right]_{2987} = \mathbf{Pl}(0,0,1,1,11,1)_{50226}$$

$$\ell_5 = \left[\begin{array}{cccc} 1 & \delta^{10} & 0 & 0 \\ 0 & 0 & 1 & \delta^5 \end{array}\right]_{2997} = \left[\begin{array}{cccc} 1 & 10 & 0 & 0 \\ 0 & 0 & 1 & 11 \end{array}\right]_{2997} = \mathbf{Pl}(0,0,10,11,10,1)_{46425}$$

$$\ell_6 = \left[\begin{array}{cccc} 1 & \delta^{10} & 0 & 0 \\ 0 & 0 & 1 & \delta^{10} \end{array}\right]_{2996} = \left[\begin{array}{cccc} 1 & 10 & 0 & 0 \\ 0 & 0 & 1 & 10 \end{array}\right]_{2996} = \mathbf{Pl}(0,0,11,10,1,1)_{9736}$$

Rank of lines: (0, 3260, 3270, 3269, 2987, 2997, 2996)
Rank of points on Klein quadric: (0, 46146, 9705, 50536, 50226, 46425, 9736)

Eckardt Points

The surface has 0 Eckardt points:

Double Points

The surface has 3 Double points:
The double points on the surface are:

$P_{530} = (0,0,1,1) = \ell_1 \cap \ell_4$
$P_{2833} = (0,0,10,1) = \ell_2 \cap \ell_5$
$P_{3089} = (0,0,11,1) = \ell_3 \cap \ell_6$

Single Points

The surface has 105 single points:
The single points on the surface are:

0 : $P_0 = (1,0,0,0)$ lies on line ℓ_0
1 : $P_1 = (0,1,0,0)$ lies on line ℓ_0
2 : $P_5 = (1,1,0,0)$ lies on line ℓ_0
3 : $P_6 = (2,1,0,0)$ lies on line ℓ_0
4 : $P_7 = (3,1,0,0)$ lies on line ℓ_0
5 : $P_8 = (4,1,0,0)$ lies on line ℓ_0
6 : $P_9 = (5,1,0,0)$ lies on line ℓ_0
7 : $P_{10} = (6,1,0,0)$ lies on line ℓ_0
8 : $P_{11} = (7,1,0,0)$ lies on line ℓ_0
9 : $P_{12} = (8,1,0,0)$ lies on line ℓ_0
10 : $P_{13} = (9,1,0,0)$ lies on line ℓ_0
11 : $P_{16} = (12,1,0,0)$ lies on line ℓ_0
12 : $P_{17} = (13,1,0,0)$ lies on line ℓ_0
13 : $P_{18} = (14,1,0,0)$ lies on line ℓ_0
14 : $P_{19} = (15,1,0,0)$ lies on line ℓ_0
15 : $P_{555} = (10,1,1,1)$ lies on line ℓ_1
16 : $P_{556} = (11,1,1,1)$ lies on line ℓ_4
17 : $P_{574} = (13,2,1,1)$ lies on line ℓ_1
18 : $P_{576} = (15,2,1,1)$ lies on line ℓ_4
19 : $P_{581} = (4,3,1,1)$ lies on line ℓ_4
20 : $P_{584} = (7,3,1,1)$ lies on line ℓ_1
21 : $P_{596} = (3,4,1,1)$ lies on line ℓ_1
22 : $P_{600} = (7,4,1,1)$ lies on line ℓ_4
23 : $P_{618} = (9,5,1,1)$ lies on line ℓ_1
24 : $P_{621} = (12,5,1,1)$ lies on line ℓ_4
25 : $P_{633} = (8,6,1,1)$ lies on line ℓ_4
26 : $P_{639} = (14,6,1,1)$ lies on line ℓ_1
27 : $P_{644} = (3,7,1,1)$ lies on line ℓ_4
28 : $P_{645} = (4,7,1,1)$ lies on line ℓ_1
29 : $P_{663} = (6,8,1,1)$ lies on line ℓ_1

30 : $P_{671} = (14, 8, 1, 1)$ lies on line ℓ_4
31 : $P_{678} = (5, 9, 1, 1)$ lies on line ℓ_4
32 : $P_{685} = (12, 9, 1, 1)$ lies on line ℓ_1
33 : $P_{690} = (1, 10, 1, 1)$ lies on line ℓ_4
34 : $P_{700} = (11, 10, 1, 1)$ lies on line ℓ_1
35 : $P_{706} = (1, 11, 1, 1)$ lies on line ℓ_1
36 : $P_{715} = (10, 11, 1, 1)$ lies on line ℓ_4
37 : $P_{726} = (5, 12, 1, 1)$ lies on line ℓ_1
38 : $P_{730} = (9, 12, 1, 1)$ lies on line ℓ_4
39 : $P_{739} = (2, 13, 1, 1)$ lies on line ℓ_4
40 : $P_{752} = (15, 13, 1, 1)$ lies on line ℓ_1
41 : $P_{759} = (6, 14, 1, 1)$ lies on line ℓ_4
42 : $P_{761} = (8, 14, 1, 1)$ lies on line ℓ_1
43 : $P_{771} = (2, 15, 1, 1)$ lies on line ℓ_1
44 : $P_{782} = (13, 15, 1, 1)$ lies on line ℓ_4
45 : $P_{2859} = (10, 1, 10, 1)$ lies on line ℓ_2
46 : $P_{2860} = (11, 1, 10, 1)$ lies on line ℓ_5
47 : $P_{2878} = (13, 2, 10, 1)$ lies on line ℓ_2
48 : $P_{2880} = (15, 2, 10, 1)$ lies on line ℓ_5
49 : $P_{2885} = (4, 3, 10, 1)$ lies on line ℓ_5
50 : $P_{2888} = (7, 3, 10, 1)$ lies on line ℓ_2
51 : $P_{2900} = (3, 4, 10, 1)$ lies on line ℓ_2
52 : $P_{2904} = (7, 4, 10, 1)$ lies on line ℓ_5
53 : $P_{2922} = (9, 5, 10, 1)$ lies on line ℓ_2
54 : $P_{2925} = (12, 5, 10, 1)$ lies on line ℓ_5
55 : $P_{2937} = (8, 6, 10, 1)$ lies on line ℓ_5
56 : $P_{2943} = (14, 6, 10, 1)$ lies on line ℓ_2
57 : $P_{2948} = (3, 7, 10, 1)$ lies on line ℓ_5
58 : $P_{2949} = (4, 7, 10, 1)$ lies on line ℓ_2
59 : $P_{2967} = (6, 8, 10, 1)$ lies on line ℓ_2
60 : $P_{2975} = (14, 8, 10, 1)$ lies on line ℓ_5
61 : $P_{2982} = (5, 9, 10, 1)$ lies on line ℓ_5
62 : $P_{2989} = (12, 9, 10, 1)$ lies on line ℓ_2
63 : $P_{2994} = (1, 10, 10, 1)$ lies on line ℓ_5
64 : $P_{3004} = (11, 10, 10, 1)$ lies on line ℓ_2
65 : $P_{3010} = (1, 11, 10, 1)$ lies on line ℓ_2
66 : $P_{3019} = (10, 11, 10, 1)$ lies on line ℓ_5
67 : $P_{3030} = (5, 12, 10, 1)$ lies on line ℓ_2
68 : $P_{3034} = (9, 12, 10, 1)$ lies on line ℓ_5
69 : $P_{3043} = (2, 13, 10, 1)$ lies on line ℓ_5
70 : $P_{3056} = (15, 13, 10, 1)$ lies on line ℓ_2
71 : $P_{3063} = (6, 14, 10, 1)$ lies on line ℓ_5
72 : $P_{3065} = (8, 14, 10, 1)$ lies on line ℓ_2
73 : $P_{3075} = (2, 15, 10, 1)$ lies on line ℓ_2
74 : $P_{3086} = (13, 15, 10, 1)$ lies on line ℓ_5
75 : $P_{3115} = (10, 1, 11, 1)$ lies on line ℓ_3
76 : $P_{3116} = (11, 1, 11, 1)$ lies on line ℓ_6
77 : $P_{3134} = (13, 2, 11, 1)$ lies on line ℓ_3
78 : $P_{3136} = (15, 2, 11, 1)$ lies on line ℓ_6
79 : $P_{3141} = (4, 3, 11, 1)$ lies on line ℓ_6
80 : $P_{3144} = (7, 3, 11, 1)$ lies on line ℓ_3
81 : $P_{3156} = (3, 4, 11, 1)$ lies on line ℓ_3
82 : $P_{3160} = (7, 4, 11, 1)$ lies on line ℓ_6
83 : $P_{3178} = (9, 5, 11, 1)$ lies on line ℓ_3
84 : $P_{3181} = (12, 5, 11, 1)$ lies on line ℓ_6
85 : $P_{3193} = (8, 6, 11, 1)$ lies on line ℓ_6
86 : $P_{3199} = (14, 6, 11, 1)$ lies on line ℓ_3
87 : $P_{3204} = (3, 7, 11, 1)$ lies on line ℓ_6
88 : $P_{3205} = (4, 7, 11, 1)$ lies on line ℓ_3
89 : $P_{3223} = (6, 8, 11, 1)$ lies on line ℓ_3
90 : $P_{3231} = (14, 8, 11, 1)$ lies on line ℓ_6
91 : $P_{3238} = (5, 9, 11, 1)$ lies on line ℓ_6
92 : $P_{3245} = (12, 9, 11, 1)$ lies on line ℓ_3
93 : $P_{3250} = (1, 10, 11, 1)$ lies on line ℓ_6
94 : $P_{3260} = (11, 10, 11, 1)$ lies on line ℓ_3
95 : $P_{3266} = (1, 11, 11, 1)$ lies on line ℓ_3
96 : $P_{3275} = (10, 11, 11, 1)$ lies on line ℓ_6
97 : $P_{3286} = (5, 12, 11, 1)$ lies on line ℓ_3
98 : $P_{3290} = (9, 12, 11, 1)$ lies on line ℓ_6
99 : $P_{3299} = (2, 13, 11, 1)$ lies on line ℓ_6
100 : $P_{3312} = (15, 13, 11, 1)$ lies on line ℓ_3
101 : $P_{3319} = (6, 14, 11, 1)$ lies on line ℓ_6
102 : $P_{3321} = (8, 14, 11, 1)$ lies on line ℓ_3
103 : $P_{3331} = (2, 15, 11, 1)$ lies on line ℓ_3
104 : $P_{3342} = (13, 15, 11, 1)$ lies on line ℓ_6

The single points on the surface are:

Points on surface but on no line

The surface has 195 points not on any line:
The points on the surface but not on lines are:

0 : $P_{20} = (1, 0, 1, 0)$
1 : $P_{35} = (0, 1, 1, 0)$
2 : $P_{36} = (1, 1, 1, 0)$
3 : $P_{60} = (9, 2, 1, 0)$
4 : $P_{62} = (11, 2, 1, 0)$
5 : $P_{93} = (10, 4, 1, 0)$
6 : $P_{97} = (14, 4, 1, 0)$
7 : $P_{165} = (2, 9, 1, 0)$
8 : $P_{174} = (11, 9, 1, 0)$
9 : $P_{183} = (4, 10, 1, 0)$
10 : $P_{193} = (14, 10, 1, 0)$
11 : $P_{197} = (2, 11, 1, 0)$

12 : $P_{204} = (9, 11, 1, 0)$
13 : $P_{247} = (4, 14, 1, 0)$
14 : $P_{253} = (10, 14, 1, 0)$
15 : $P_{790} = (5, 0, 2, 1)$
16 : $P_{858} = (9, 4, 2, 1)$
17 : $P_{862} = (13, 4, 2, 1)$
18 : $P_{865} = (0, 5, 2, 1)$
19 : $P_{870} = (5, 5, 2, 1)$
20 : $P_{891} = (10, 6, 2, 1)$
21 : $P_{893} = (12, 6, 2, 1)$
22 : $P_{933} = (4, 9, 2, 1)$
23 : $P_{942} = (13, 9, 2, 1)$
24 : $P_{951} = (6, 10, 2, 1)$
25 : $P_{957} = (12, 10, 2, 1)$
26 : $P_{983} = (6, 12, 2, 1)$
27 : $P_{987} = (10, 12, 2, 1)$
28 : $P_{997} = (4, 13, 2, 1)$
29 : $P_{1002} = (9, 13, 2, 1)$
30 : $P_{1047} = (6, 0, 3, 1)$
31 : $P_{1071} = (14, 1, 3, 1)$
32 : $P_{1072} = (15, 1, 3, 1)$
33 : $P_{1113} = (8, 4, 3, 1)$
34 : $P_{1117} = (12, 4, 3, 1)$
35 : $P_{1137} = (0, 6, 3, 1)$
36 : $P_{1143} = (6, 6, 3, 1)$
37 : $P_{1173} = (4, 8, 3, 1)$
38 : $P_{1181} = (12, 8, 3, 1)$
39 : $P_{1237} = (4, 12, 3, 1)$
40 : $P_{1241} = (8, 12, 3, 1)$
41 : $P_{1266} = (1, 14, 3, 1)$
42 : $P_{1280} = (15, 14, 3, 1)$
43 : $P_{1282} = (1, 15, 3, 1)$
44 : $P_{1295} = (14, 15, 3, 1)$
45 : $P_{1305} = (8, 0, 4, 1)$
46 : $P_{1404} = (11, 6, 4, 1)$
47 : $P_{1406} = (13, 6, 4, 1)$
48 : $P_{1418} = (9, 7, 4, 1)$
49 : $P_{1423} = (14, 7, 4, 1)$
50 : $P_{1425} = (0, 8, 4, 1)$
51 : $P_{1433} = (8, 8, 4, 1)$
52 : $P_{1448} = (7, 9, 4, 1)$
53 : $P_{1455} = (14, 9, 4, 1)$
54 : $P_{1479} = (6, 11, 4, 1)$
55 : $P_{1486} = (13, 11, 4, 1)$
56 : $P_{1511} = (6, 13, 4, 1)$
57 : $P_{1516} = (11, 13, 4, 1)$
58 : $P_{1528} = (7, 14, 4, 1)$
59 : $P_{1530} = (9, 14, 4, 1)$
60 : $P_{1566} = (13, 0, 5, 1)$
61 : $P_{1571} = (2, 1, 5, 1)$
62 : $P_{1572} = (3, 1, 5, 1)$
63 : $P_{1586} = (1, 2, 5, 1)$
64 : $P_{1588} = (3, 2, 5, 1)$
65 : $P_{1602} = (1, 3, 5, 1)$
66 : $P_{1603} = (2, 3, 5, 1)$
67 : $P_{1658} = (9, 6, 5, 1)$
68 : $P_{1664} = (15, 6, 5, 1)$
69 : $P_{1703} = (6, 9, 5, 1)$
70 : $P_{1712} = (15, 9, 5, 1)$
71 : $P_{1761} = (0, 13, 5, 1)$
72 : $P_{1774} = (13, 13, 5, 1)$
73 : $P_{1799} = (6, 15, 5, 1)$
74 : $P_{1802} = (9, 15, 5, 1)$
75 : $P_{1813} = (4, 0, 6, 1)$
76 : $P_{1866} = (9, 3, 6, 1)$
77 : $P_{1867} = (10, 3, 6, 1)$
78 : $P_{1873} = (0, 4, 6, 1)$
79 : $P_{1877} = (4, 4, 6, 1)$
80 : $P_{1929} = (8, 7, 6, 1)$
81 : $P_{1936} = (15, 7, 6, 1)$
82 : $P_{1944} = (7, 8, 6, 1)$
83 : $P_{1952} = (15, 8, 6, 1)$
84 : $P_{1956} = (3, 9, 6, 1)$
85 : $P_{1963} = (10, 9, 6, 1)$
86 : $P_{1972} = (3, 10, 6, 1)$
87 : $P_{1978} = (9, 10, 6, 1)$
88 : $P_{2056} = (7, 15, 6, 1)$
89 : $P_{2057} = (8, 15, 6, 1)$
90 : $P_{2079} = (14, 0, 7, 1)$
91 : $P_{2105} = (8, 2, 7, 1)$
92 : $P_{2107} = (10, 2, 7, 1)$
93 : $P_{2118} = (5, 3, 7, 1)$
94 : $P_{2119} = (6, 3, 7, 1)$
95 : $P_{2148} = (3, 5, 7, 1)$
96 : $P_{2151} = (6, 5, 7, 1)$
97 : $P_{2164} = (3, 6, 7, 1)$
98 : $P_{2166} = (5, 6, 7, 1)$
99 : $P_{2195} = (2, 8, 7, 1)$
100 : $P_{2203} = (10, 8, 7, 1)$
101 : $P_{2227} = (2, 10, 7, 1)$
102 : $P_{2233} = (8, 10, 7, 1)$
103 : $P_{2289} = (0, 14, 7, 1)$
104 : $P_{2303} = (14, 14, 7, 1)$
105 : $P_{2328} = (7, 0, 8, 1)$
106 : $P_{2341} = (4, 1, 8, 1)$
107 : $P_{2342} = (5, 1, 8, 1)$
108 : $P_{2382} = (13, 3, 8, 1)$
109 : $P_{2383} = (14, 3, 8, 1)$
110 : $P_{2386} = (1, 4, 8, 1)$
111 : $P_{2390} = (5, 4, 8, 1)$
112 : $P_{2402} = (1, 5, 8, 1)$
113 : $P_{2405} = (4, 5, 8, 1)$
114 : $P_{2433} = (0, 7, 8, 1)$
115 : $P_{2440} = (7, 7, 8, 1)$
116 : $P_{2532} = (3, 13, 8, 1)$
117 : $P_{2543} = (14, 13, 8, 1)$
118 : $P_{2548} = (3, 14, 8, 1)$
119 : $P_{2558} = (13, 14, 8, 1)$

120 : $P_{2592} = (15, 0, 9, 1)$
121 : $P_{2621} = (12, 2, 9, 1)$
122 : $P_{2623} = (14, 2, 9, 1)$
123 : $P_{2699} = (10, 7, 9, 1)$
124 : $P_{2702} = (13, 7, 9, 1)$
125 : $P_{2744} = (7, 10, 9, 1)$
126 : $P_{2750} = (13, 10, 9, 1)$
127 : $P_{2771} = (2, 12, 9, 1)$
128 : $P_{2783} = (14, 12, 9, 1)$
129 : $P_{2792} = (7, 13, 9, 1)$
130 : $P_{2795} = (10, 13, 9, 1)$
131 : $P_{2803} = (2, 14, 9, 1)$
132 : $P_{2813} = (12, 14, 9, 1)$
133 : $P_{2817} = (0, 15, 9, 1)$
134 : $P_{2832} = (15, 15, 9, 1)$
135 : $P_{3347} = (2, 0, 12, 1)$
136 : $P_{3377} = (0, 2, 12, 1)$
137 : $P_{3379} = (2, 2, 12, 1)$
138 : $P_{3420} = (11, 4, 12, 1)$
139 : $P_{3424} = (15, 4, 12, 1)$
140 : $P_{3433} = (8, 5, 12, 1)$
141 : $P_{3438} = (13, 5, 12, 1)$
142 : $P_{3478} = (5, 8, 12, 1)$
143 : $P_{3486} = (13, 8, 12, 1)$
144 : $P_{3525} = (4, 11, 12, 1)$
145 : $P_{3536} = (15, 11, 12, 1)$
146 : $P_{3558} = (5, 13, 12, 1)$
147 : $P_{3561} = (8, 13, 12, 1)$
148 : $P_{3589} = (4, 15, 12, 1)$
149 : $P_{3596} = (11, 15, 12, 1)$
150 : $P_{3610} = (9, 0, 13, 1)$
151 : $P_{3661} = (12, 3, 13, 1)$
152 : $P_{3664} = (15, 3, 13, 1)$
153 : $P_{3692} = (11, 5, 13, 1)$
154 : $P_{3695} = (14, 5, 13, 1)$
155 : $P_{3745} = (0, 9, 13, 1)$
156 : $P_{3754} = (9, 9, 13, 1)$
157 : $P_{3782} = (5, 11, 13, 1)$
158 : $P_{3791} = (14, 11, 13, 1)$
159 : $P_{3796} = (3, 12, 13, 1)$
160 : $P_{3808} = (15, 12, 13, 1)$
161 : $P_{3830} = (5, 14, 13, 1)$
162 : $P_{3836} = (11, 14, 13, 1)$
163 : $P_{3844} = (3, 15, 13, 1)$
164 : $P_{3853} = (12, 15, 13, 1)$
165 : $P_{3860} = (3, 0, 14, 1)$
166 : $P_{3893} = (4, 2, 14, 1)$
167 : $P_{3895} = (6, 2, 14, 1)$
168 : $P_{3905} = (0, 3, 14, 1)$
169 : $P_{3908} = (3, 3, 14, 1)$
170 : $P_{3923} = (2, 4, 14, 1)$
171 : $P_{3927} = (6, 4, 14, 1)$
172 : $P_{3955} = (2, 6, 14, 1)$
173 : $P_{3957} = (4, 6, 14, 1)$
174 : $P_{3980} = (11, 7, 14, 1)$
175 : $P_{3981} = (12, 7, 14, 1)$
176 : $P_{4040} = (7, 11, 14, 1)$
177 : $P_{4045} = (12, 11, 14, 1)$
178 : $P_{4056} = (7, 12, 14, 1)$
179 : $P_{4060} = (11, 12, 14, 1)$
180 : $P_{4125} = (12, 0, 15, 1)$
181 : $P_{4137} = (8, 1, 15, 1)$
182 : $P_{4138} = (9, 1, 15, 1)$
183 : $P_{4150} = (5, 2, 15, 1)$
184 : $P_{4152} = (7, 2, 15, 1)$
185 : $P_{4195} = (2, 5, 15, 1)$
186 : $P_{4200} = (7, 5, 15, 1)$
187 : $P_{4227} = (2, 7, 15, 1)$
188 : $P_{4230} = (5, 7, 15, 1)$
189 : $P_{4242} = (1, 8, 15, 1)$
190 : $P_{4250} = (9, 8, 15, 1)$
191 : $P_{4258} = (1, 9, 15, 1)$
192 : $P_{4265} = (8, 9, 15, 1)$
193 : $P_{4305} = (0, 12, 15, 1)$
194 : $P_{4317} = (12, 12, 15, 1)$

Line Intersection Graph

	0	1	2	3	4	5	6
0	0	1	1	1	1	1	1
1	1	0	1	1	1	0	0
2	1	1	0	1	0	1	0
3	1	1	1	0	0	0	1
4	1	1	0	0	0	1	1
5	1	0	1	0	1	0	1
6	1	0	0	1	1	1	0

Neighbor sets in the line intersection graph:
Line 0 intersects

Line	ℓ_1	ℓ_2	ℓ_3	ℓ_4	ℓ_5	ℓ_6
in point	P_{14}	P_{14}	P_{14}	P_{15}	P_{15}	P_{15}

Line 1 intersects

Line	ℓ_0	ℓ_2	ℓ_3	ℓ_4
in point	P_{14}	P_{14}	P_{14}	P_{530}

Line 2 intersects

Line	ℓ_0	ℓ_1	ℓ_3	ℓ_5
in point	P_{14}	P_{14}	P_{14}	P_{2833}

Line 3 intersects

Line	ℓ_0	ℓ_1	ℓ_2	ℓ_6
in point	P_{14}	P_{14}	P_{14}	P_{3089}

Line 4 intersects

Line	ℓ_0	ℓ_1	ℓ_5	ℓ_6
in point	P_{15}	P_{530}	P_{15}	P_{15}

Line 5 intersects

Line	ℓ_0	ℓ_2	ℓ_4	ℓ_6
in point	P_{15}	P_{2833}	P_{15}	P_{15}

Line 6 intersects

Line	ℓ_0	ℓ_3	ℓ_4	ℓ_5
in point	P_{15}	P_{3089}	P_{15}	P_{15}

The surface has 305 points:
The points on the surface are:

$0: P_0 = (1,0,0,0)$
$1: P_1 = (0,1,0,0)$
$2: P_5 = (1,1,0,0)$
$3: P_6 = (2,1,0,0)$
$4: P_7 = (3,1,0,0)$
$5: P_8 = (4,1,0,0)$
$6: P_9 = (5,1,0,0)$
$7: P_{10} = (6,1,0,0)$
$8: P_{11} = (7,1,0,0)$
$9: P_{12} = (8,1,0,0)$
$10: P_{13} = (9,1,0,0)$
$11: P_{14} = (10,1,0,0)$
$12: P_{15} = (11,1,0,0)$
$13: P_{16} = (12,1,0,0)$
$14: P_{17} = (13,1,0,0)$
$15: P_{18} = (14,1,0,0)$
$16: P_{19} = (15,1,0,0)$
$17: P_{20} = (1,0,1,0)$
$18: P_{35} = (0,1,1,0)$
$19: P_{36} = (1,1,1,0)$
$20: P_{60} = (9,2,1,0)$
$21: P_{62} = (11,2,1,0)$
$22: P_{93} = (10,4,1,0)$
$23: P_{97} = (14,4,1,0)$
$24: P_{165} = (2,9,1,0)$
$25: P_{174} = (11,9,1,0)$
$26: P_{183} = (4,10,1,0)$
$27: P_{193} = (14,10,1,0)$
$28: P_{197} = (2,11,1,0)$
$29: P_{204} = (9,11,1,0)$
$30: P_{247} = (4,14,1,0)$
$31: P_{253} = (10,14,1,0)$
$32: P_{530} = (0,0,1,1)$
$33: P_{555} = (10,1,1,1)$
$34: P_{556} = (11,1,1,1)$
$35: P_{574} = (13,2,1,1)$
$36: P_{576} = (15,2,1,1)$
$37: P_{581} = (4,3,1,1)$
$38: P_{584} = (7,3,1,1)$
$39: P_{596} = (3,4,1,1)$
$40: P_{600} = (7,4,1,1)$
$41: P_{618} = (9,5,1,1)$
$42: P_{621} = (12,5,1,1)$
$43: P_{633} = (8,6,1,1)$
$44: P_{639} = (14,6,1,1)$
$45: P_{644} = (3,7,1,1)$
$46: P_{645} = (4,7,1,1)$
$47: P_{663} = (6,8,1,1)$
$48: P_{671} = (14,8,1,1)$
$49: P_{678} = (5,9,1,1)$
$50: P_{685} = (12,9,1,1)$
$51: P_{690} = (1,10,1,1)$
$52: P_{700} = (11,10,1,1)$
$53: P_{706} = (1,11,1,1)$
$54: P_{715} = (10,11,1,1)$
$55: P_{726} = (5,12,1,1)$
$56: P_{730} = (9,12,1,1)$
$57: P_{739} = (2,13,1,1)$
$58: P_{752} = (15,13,1,1)$
$59: P_{759} = (6,14,1,1)$
$60: P_{761} = (8,14,1,1)$
$61: P_{771} = (2,15,1,1)$
$62: P_{782} = (13,15,1,1)$
$63: P_{790} = (5,0,2,1)$
$64: P_{858} = (9,4,2,1)$
$65: P_{862} = (13,4,2,1)$
$66: P_{865} = (0,5,2,1)$
$67: P_{870} = (5,5,2,1)$
$68: P_{891} = (10,6,2,1)$
$69: P_{893} = (12,6,2,1)$
$70: P_{933} = (4,9,2,1)$
$71: P_{942} = (13,9,2,1)$
$72: P_{951} = (6,10,2,1)$
$73: P_{957} = (12,10,2,1)$
$74: P_{983} = (6,12,2,1)$
$75: P_{987} = (10,12,2,1)$
$76: P_{997} = (4,13,2,1)$
$77: P_{1002} = (9,13,2,1)$
$78: P_{1047} = (6,0,3,1)$
$79: P_{1071} = (14,1,3,1)$
$80: P_{1072} = (15,1,3,1)$
$81: P_{1113} = (8,4,3,1)$
$82: P_{1117} = (12,4,3,1)$
$83: P_{1137} = (0,6,3,1)$
$84: P_{1143} = (6,6,3,1)$
$85: P_{1173} = (4,8,3,1)$
$86: P_{1181} = (12,8,3,1)$
$87: P_{1237} = (4,12,3,1)$
$88: P_{1241} = (8,12,3,1)$
$89: P_{1266} = (1,14,3,1)$

90 : $P_{1280} = (15, 14, 3, 1)$
91 : $P_{1282} = (1, 15, 3, 1)$
92 : $P_{1295} = (14, 15, 3, 1)$
93 : $P_{1305} = (8, 0, 4, 1)$
94 : $P_{1404} = (11, 6, 4, 1)$
95 : $P_{1406} = (13, 6, 4, 1)$
96 : $P_{1418} = (9, 7, 4, 1)$
97 : $P_{1423} = (14, 7, 4, 1)$
98 : $P_{1425} = (0, 8, 4, 1)$
99 : $P_{1433} = (8, 8, 4, 1)$
100 : $P_{1448} = (7, 9, 4, 1)$
101 : $P_{1455} = (14, 9, 4, 1)$
102 : $P_{1479} = (6, 11, 4, 1)$
103 : $P_{1486} = (13, 11, 4, 1)$
104 : $P_{1511} = (6, 13, 4, 1)$
105 : $P_{1516} = (11, 13, 4, 1)$
106 : $P_{1528} = (7, 14, 4, 1)$
107 : $P_{1530} = (9, 14, 4, 1)$
108 : $P_{1566} = (13, 0, 5, 1)$
109 : $P_{1571} = (2, 1, 5, 1)$
110 : $P_{1572} = (3, 1, 5, 1)$
111 : $P_{1586} = (1, 2, 5, 1)$
112 : $P_{1588} = (3, 2, 5, 1)$
113 : $P_{1602} = (1, 3, 5, 1)$
114 : $P_{1603} = (2, 3, 5, 1)$
115 : $P_{1658} = (9, 6, 5, 1)$
116 : $P_{1664} = (15, 6, 5, 1)$
117 : $P_{1703} = (6, 9, 5, 1)$
118 : $P_{1712} = (15, 9, 5, 1)$
119 : $P_{1761} = (0, 13, 5, 1)$
120 : $P_{1774} = (13, 13, 5, 1)$
121 : $P_{1799} = (6, 15, 5, 1)$
122 : $P_{1802} = (9, 15, 5, 1)$
123 : $P_{1813} = (4, 0, 6, 1)$
124 : $P_{1866} = (9, 3, 6, 1)$
125 : $P_{1867} = (10, 3, 6, 1)$
126 : $P_{1873} = (0, 4, 6, 1)$
127 : $P_{1877} = (4, 4, 6, 1)$
128 : $P_{1929} = (8, 7, 6, 1)$
129 : $P_{1936} = (15, 7, 6, 1)$
130 : $P_{1944} = (7, 8, 6, 1)$
131 : $P_{1952} = (15, 8, 6, 1)$
132 : $P_{1956} = (3, 9, 6, 1)$
133 : $P_{1963} = (10, 9, 6, 1)$
134 : $P_{1972} = (3, 10, 6, 1)$
135 : $P_{1978} = (9, 10, 6, 1)$
136 : $P_{2056} = (7, 15, 6, 1)$
137 : $P_{2057} = (8, 15, 6, 1)$
138 : $P_{2079} = (14, 0, 7, 1)$
139 : $P_{2105} = (8, 2, 7, 1)$
140 : $P_{2107} = (10, 2, 7, 1)$
141 : $P_{2118} = (5, 3, 7, 1)$
142 : $P_{2119} = (6, 3, 7, 1)$
143 : $P_{2148} = (3, 5, 7, 1)$
144 : $P_{2151} = (6, 5, 7, 1)$
145 : $P_{2164} = (3, 6, 7, 1)$
146 : $P_{2166} = (5, 6, 7, 1)$
147 : $P_{2195} = (2, 8, 7, 1)$
148 : $P_{2203} = (10, 8, 7, 1)$
149 : $P_{2227} = (2, 10, 7, 1)$
150 : $P_{2233} = (8, 10, 7, 1)$
151 : $P_{2289} = (0, 14, 7, 1)$
152 : $P_{2303} = (14, 14, 7, 1)$
153 : $P_{2328} = (7, 0, 8, 1)$
154 : $P_{2341} = (4, 1, 8, 1)$
155 : $P_{2342} = (5, 1, 8, 1)$
156 : $P_{2382} = (13, 3, 8, 1)$
157 : $P_{2383} = (14, 3, 8, 1)$
158 : $P_{2386} = (1, 4, 8, 1)$
159 : $P_{2390} = (5, 4, 8, 1)$
160 : $P_{2402} = (1, 5, 8, 1)$
161 : $P_{2405} = (4, 5, 8, 1)$
162 : $P_{2433} = (0, 7, 8, 1)$
163 : $P_{2440} = (7, 7, 8, 1)$
164 : $P_{2532} = (3, 13, 8, 1)$
165 : $P_{2543} = (14, 13, 8, 1)$
166 : $P_{2548} = (3, 14, 8, 1)$
167 : $P_{2558} = (13, 14, 8, 1)$
168 : $P_{2592} = (15, 0, 9, 1)$
169 : $P_{2621} = (12, 2, 9, 1)$
170 : $P_{2623} = (14, 2, 9, 1)$
171 : $P_{2699} = (10, 7, 9, 1)$
172 : $P_{2702} = (13, 7, 9, 1)$
173 : $P_{2744} = (7, 10, 9, 1)$
174 : $P_{2750} = (13, 10, 9, 1)$
175 : $P_{2771} = (2, 12, 9, 1)$
176 : $P_{2783} = (14, 12, 9, 1)$
177 : $P_{2792} = (7, 13, 9, 1)$
178 : $P_{2795} = (10, 13, 9, 1)$
179 : $P_{2803} = (2, 14, 9, 1)$
180 : $P_{2813} = (12, 14, 9, 1)$
181 : $P_{2817} = (0, 15, 9, 1)$
182 : $P_{2832} = (15, 15, 9, 1)$
183 : $P_{2833} = (0, 0, 10, 1)$
184 : $P_{2859} = (10, 1, 10, 1)$
185 : $P_{2860} = (11, 1, 10, 1)$
186 : $P_{2878} = (13, 2, 10, 1)$
187 : $P_{2880} = (15, 2, 10, 1)$
188 : $P_{2885} = (4, 3, 10, 1)$
189 : $P_{2888} = (7, 3, 10, 1)$
190 : $P_{2900} = (3, 4, 10, 1)$
191 : $P_{2904} = (7, 4, 10, 1)$
192 : $P_{2922} = (9, 5, 10, 1)$
193 : $P_{2925} = (12, 5, 10, 1)$
194 : $P_{2937} = (8, 6, 10, 1)$
195 : $P_{2943} = (14, 6, 10, 1)$
196 : $P_{2948} = (3, 7, 10, 1)$
197 : $P_{2949} = (4, 7, 10, 1)$
198 : $P_{2967} = (6, 8, 10, 1)$
199 : $P_{2975} = (14, 8, 10, 1)$
200 : $P_{2982} = (5, 9, 10, 1)$
201 : $P_{2989} = (12, 9, 10, 1)$
202 : $P_{2994} = (1, 10, 10, 1)$
203 : $P_{3004} = (11, 10, 10, 1)$
204 : $P_{3010} = (1, 11, 10, 1)$
205 : $P_{3019} = (10, 11, 10, 1)$
206 : $P_{3030} = (5, 12, 10, 1)$
207 : $P_{3034} = (9, 12, 10, 1)$
208 : $P_{3043} = (2, 13, 10, 1)$
209 : $P_{3056} = (15, 13, 10, 1)$
210 : $P_{3063} = (6, 14, 10, 1)$
211 : $P_{3065} = (8, 14, 10, 1)$
212 : $P_{3075} = (2, 15, 10, 1)$
213 : $P_{3086} = (13, 15, 10, 1)$
214 : $P_{3089} = (0, 0, 11, 1)$
215 : $P_{3115} = (10, 1, 11, 1)$
216 : $P_{3116} = (11, 1, 11, 1)$
217 : $P_{3134} = (13, 2, 11, 1)$
218 : $P_{3136} = (15, 2, 11, 1)$
219 : $P_{3141} = (4, 3, 11, 1)$
220 : $P_{3144} = (7, 3, 11, 1)$
221 : $P_{3156} = (3, 4, 11, 1)$
222 : $P_{3160} = (7, 4, 11, 1)$
223 : $P_{3178} = (9, 5, 11, 1)$
224 : $P_{3181} = (12, 5, 11, 1)$
225 : $P_{3193} = (8, 6, 11, 1)$
226 : $P_{3199} = (14, 6, 11, 1)$
227 : $P_{3204} = (3, 7, 11, 1)$
228 : $P_{3205} = (4, 7, 11, 1)$
229 : $P_{3223} = (6, 8, 11, 1)$
230 : $P_{3231} = (14, 8, 11, 1)$
231 : $P_{3238} = (5, 9, 11, 1)$
232 : $P_{3245} = (12, 9, 11, 1)$
233 : $P_{3250} = (1, 10, 11, 1)$
234 : $P_{3260} = (11, 10, 11, 1)$
235 : $P_{3266} = (1, 11, 11, 1)$
236 : $P_{3275} = (10, 11, 11, 1)$
237 : $P_{3286} = (5, 12, 11, 1)$
238 : $P_{3290} = (9, 12, 11, 1)$
239 : $P_{3299} = (2, 13, 11, 1)$
240 : $P_{3312} = (15, 13, 11, 1)$
241 : $P_{3319} = (6, 14, 11, 1)$
242 : $P_{3321} = (8, 14, 11, 1)$
243 : $P_{3331} = (2, 15, 11, 1)$
244 : $P_{3342} = (13, 15, 11, 1)$
245 : $P_{3347} = (2, 0, 12, 1)$
246 : $P_{3377} = (0, 2, 12, 1)$
247 : $P_{3379} = (2, 2, 12, 1)$
248 : $P_{3420} = (11, 4, 12, 1)$
249 : $P_{3424} = (15, 4, 12, 1)$
250 : $P_{3433} = (8, 5, 12, 1)$
251 : $P_{3438} = (13, 5, 12, 1)$

$252: P_{3478} = (5, 8, 12, 1)$
$253: P_{3486} = (13, 8, 12, 1)$
$254: P_{3525} = (4, 11, 12, 1)$
$255: P_{3536} = (15, 11, 12, 1)$
$256: P_{3558} = (5, 13, 12, 1)$
$257: P_{3561} = (8, 13, 12, 1)$
$258: P_{3589} = (4, 15, 12, 1)$
$259: P_{3596} = (11, 15, 12, 1)$
$260: P_{3610} = (9, 0, 13, 1)$
$261: P_{3661} = (12, 3, 13, 1)$
$262: P_{3664} = (15, 3, 13, 1)$
$263: P_{3692} = (11, 5, 13, 1)$
$264: P_{3695} = (14, 5, 13, 1)$
$265: P_{3745} = (0, 9, 13, 1)$
$266: P_{3754} = (9, 9, 13, 1)$
$267: P_{3782} = (5, 11, 13, 1)$
$268: P_{3791} = (14, 11, 13, 1)$
$269: P_{3796} = (3, 12, 13, 1)$
$270: P_{3808} = (15, 12, 13, 1)$
$271: P_{3830} = (5, 14, 13, 1)$
$272: P_{3836} = (11, 14, 13, 1)$
$273: P_{3844} = (3, 15, 13, 1)$
$274: P_{3853} = (12, 15, 13, 1)$
$275: P_{3860} = (3, 0, 14, 1)$
$276: P_{3893} = (4, 2, 14, 1)$
$277: P_{3895} = (6, 2, 14, 1)$
$278: P_{3905} = (0, 3, 14, 1)$
$279: P_{3908} = (3, 3, 14, 1)$
$280: P_{3923} = (2, 4, 14, 1)$
$281: P_{3927} = (6, 4, 14, 1)$
$282: P_{3955} = (2, 6, 14, 1)$
$283: P_{3957} = (4, 6, 14, 1)$
$284: P_{3980} = (11, 7, 14, 1)$
$285: P_{3981} = (12, 7, 14, 1)$
$286: P_{4040} = (7, 11, 14, 1)$
$287: P_{4045} = (12, 11, 14, 1)$
$288: P_{4056} = (7, 12, 14, 1)$
$289: P_{4060} = (11, 12, 14, 1)$
$290: P_{4125} = (12, 0, 15, 1)$
$291: P_{4137} = (8, 1, 15, 1)$
$292: P_{4138} = (9, 1, 15, 1)$
$293: P_{4150} = (5, 2, 15, 1)$
$294: P_{4152} = (7, 2, 15, 1)$
$295: P_{4195} = (2, 5, 15, 1)$
$296: P_{4200} = (7, 5, 15, 1)$
$297: P_{4227} = (2, 7, 15, 1)$
$298: P_{4230} = (5, 7, 15, 1)$
$299: P_{4242} = (1, 8, 15, 1)$
$300: P_{4250} = (9, 8, 15, 1)$
$301: P_{4258} = (1, 9, 15, 1)$
$302: P_{4265} = (8, 9, 15, 1)$
$303: P_{4305} = (0, 12, 15, 1)$
$304: P_{4317} = (12, 12, 15, 1)$