Rank-74295 over GF(16)

January 15, 2021

The equation

The equation of the surface is :

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

(0, 0, 1, 0, 1, 1, 0, 0, 0, 1, 0, 0, 0, 1, 0, 0, 1, 0, 0, 0)
The point rank of the equation over GF(16) is 287445525

General information

Number of lines	6
Number of points	305
Number of singular points	1
Number of Eckardt points	1
Number of double points	6
Number of single points	87
Number of points off lines	211
Number of Hesse planes	0
Number of axes	0
Type of points on lines	17^6
Type of lines on points	3, 2^6, 1^{87}, 0^{211}

Singular Points

The surface has 1 singular points:

$0: \ P_{20} = \mathbf{P}(1,0,1,0) = \mathbf{P}(1,0,1,0)$

The 6 Lines

The lines and their Pluecker coordinates are:

$$\ell_0 = \begin{bmatrix} 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 0 \end{bmatrix}_{273} = \begin{bmatrix} 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 0 \end{bmatrix}_{273} = \mathbf{Pl}(1,0,0,0,0,1)_{4626}$$

$$\ell_1 = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 1 & 1 \end{bmatrix}_{17} = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 1 & 1 \end{bmatrix}_{17} = \mathbf{Pl}(1,0,1,0,1,0)_{321}$$

$$\ell_2 = \begin{bmatrix} 1 & 0 & 1 & 0 \\ 0 & 1 & \delta^{10} & 1 \end{bmatrix}_{299} = \begin{bmatrix} 1 & 0 & 1 & 0 \\ 0 & 1 & 10 & 1 \end{bmatrix}_{299} = \mathbf{Pl}(1,1,10,0,1,1)_{9111}$$

$$\ell_3 = \begin{bmatrix} 1 & 0 & 1 & 0 \\ 0 & 1 & \delta^{5} & 1 \end{bmatrix}_{300} = \begin{bmatrix} 1 & 0 & 1 & 0 \\ 0 & 1 & 11 & 1 \end{bmatrix}_{300} = \mathbf{Pl}(1,1,11,0,1,1)_{9126}$$

$$\ell_4 = \begin{bmatrix} 1 & 0 & \delta^{10} & \delta^{10} \\ 0 & 1 & \delta^{10} & 1 \end{bmatrix}_{46436} = \begin{bmatrix} 1 & 0 & 10 & 10 \\ 0 & 1 & 10 & 1 \end{bmatrix}_{46436} = \mathbf{Pl}(10,11,1,1,11,1)_{50820}$$

$$\ell_5 = \begin{bmatrix} 1 & 0 & \delta^{5} & \delta^{5} \\ 0 & 1 & \delta^{5} & 1 \end{bmatrix}_{51078} = \begin{bmatrix} 1 & 0 & 11 & 11 \\ 0 & 1 & 11 & 1 \end{bmatrix}_{51078} = \mathbf{Pl}(11,10,1,1,10,1)_{46756}$$

Rank of lines: (273, 17, 299, 300, 46436, 51078)
Rank of points on Klein quadric: (4626, 321, 9111, 9126, 50820, 46756)

Eckardt Points

The surface has 1 Eckardt points:
$0 : P_{20} = \mathbf{P}(1,0,1,0) = \mathbf{P}(1,0,1,0)$.

Double Points

The surface has 6 Double points:
The double points on the surface are:

$P_{180} = (1,10,1,0) = \ell_0 \cap \ell_4$
$P_{196} = (1,11,1,0) = \ell_0 \cap \ell_5$
$P_{556} = (11,1,1,1) = \ell_1 \cap \ell_2$
$P_{555} = (10,1,1,1) = \ell_1 \cap \ell_3$
$P_{2849} = (0,1,10,1) = \ell_2 \cap \ell_4$
$P_{3105} = (0,1,11,1) = \ell_3 \cap \ell_5$

Single Points

The surface has 87 single points:
The single points on the surface are:

$0 : P_0 = (1,0,0,0)$ lies on line ℓ_1
$1 : P_1 = (0,1,0,0)$ lies on line ℓ_0
$2 : P_4 = (1,1,1,1)$ lies on line ℓ_1
$3 : P_{36} = (1,1,1,0)$ lies on line ℓ_0
$4 : P_{52} = (1,2,1,0)$ lies on line ℓ_0
$5 : P_{68} = (1,3,1,0)$ lies on line ℓ_0
$6 : P_{84} = (1,4,1,0)$ lies on line ℓ_0
$7 : P_{100} = (1,5,1,0)$ lies on line ℓ_0
$8 : P_{116} = (1,6,1,0)$ lies on line ℓ_0
$9 : P_{132} = (1,7,1,0)$ lies on line ℓ_0
$10 : P_{148} = (1,8,1,0)$ lies on line ℓ_0
$11 : P_{164} = (1,9,1,0)$ lies on line ℓ_0
$12 : P_{212} = (1,12,1,0)$ lies on line ℓ_0
$13 : P_{228} = (1,13,1,0)$ lies on line ℓ_0
$14 : P_{244} = (1,14,1,0)$ lies on line ℓ_0
$15 : P_{260} = (1,15,1,0)$ lies on line ℓ_0
$16 : P_{300} = (10,1,0,1)$ lies on line ℓ_2
$17 : P_{301} = (11,1,0,1)$ lies on line ℓ_3
$18 : P_{444} = (10,10,0,1)$ lies on line ℓ_4
$19 : P_{461} = (11,11,0,1)$ lies on line ℓ_5
$20 : P_{540} = (10,0,1,1)$ lies on line ℓ_5
$21 : P_{541} = (11,0,1,1)$ lies on line ℓ_4
$22 : P_{546} = (0,1,1,1)$ lies on line ℓ_1
$23 : P_{547} = (2,1,1,1)$ lies on line ℓ_1
$24 : P_{548} = (3,1,1,1)$ lies on line ℓ_1
$25 : P_{549} = (4,1,1,1)$ lies on line ℓ_1
$26 : P_{550} = (5,1,1,1)$ lies on line ℓ_1
$27 : P_{551} = (6,1,1,1)$ lies on line ℓ_1
$28 : P_{552} = (7,1,1,1)$ lies on line ℓ_1
$29 : P_{553} = (8,1,1,1)$ lies on line ℓ_1

30 : $P_{554} = (9, 1, 1, 1)$ lies on line ℓ_1
31 : $P_{557} = (12, 1, 1, 1)$ lies on line ℓ_1
32 : $P_{558} = (13, 1, 1, 1)$ lies on line ℓ_1
33 : $P_{559} = (14, 1, 1, 1)$ lies on line ℓ_1
34 : $P_{560} = (15, 1, 1, 1)$ lies on line ℓ_1
35 : $P_{809} = (8, 1, 2, 1)$ lies on line ℓ_2
36 : $P_{810} = (9, 1, 2, 1)$ lies on line ℓ_3
37 : $P_{858} = (9, 4, 2, 1)$ lies on line ℓ_5
38 : $P_{905} = (8, 7, 2, 1)$ lies on line ℓ_4
39 : $P_{1065} = (8, 1, 3, 1)$ lies on line ℓ_3
40 : $P_{1066} = (9, 1, 3, 1)$ lies on line ℓ_2
41 : $P_{1258} = (9, 13, 3, 1)$ lies on line ℓ_4
42 : $P_{1289} = (8, 15, 3, 1)$ lies on line ℓ_5
43 : $P_{1327} = (14, 1, 4, 1)$ lies on line ℓ_2
44 : $P_{1328} = (15, 1, 4, 1)$ lies on line ℓ_3
45 : $P_{1455} = (14, 9, 4, 1)$ lies on line ℓ_4
46 : $P_{1504} = (15, 12, 4, 1)$ lies on line ℓ_5
47 : $P_{1583} = (14, 1, 5, 1)$ lies on line ℓ_3
48 : $P_{1584} = (15, 1, 5, 1)$ lies on line ℓ_2
49 : $P_{1616} = (15, 3, 5, 1)$ lies on line ℓ_4
50 : $P_{1679} = (14, 7, 5, 1)$ lies on line ℓ_5
51 : $P_{1837} = (12, 1, 6, 1)$ lies on line ℓ_2
52 : $P_{1838} = (13, 1, 6, 1)$ lies on line ℓ_3
53 : $P_{1870} = (13, 3, 6, 1)$ lies on line ℓ_5
54 : $P_{1885} = (12, 4, 6, 1)$ lies on line ℓ_4
55 : $P_{2093} = (12, 1, 7, 1)$ lies on line ℓ_3
56 : $P_{2094} = (13, 1, 7, 1)$ lies on line ℓ_2
57 : $P_{2205} = (12, 8, 7, 1)$ lies on line ℓ_5
58 : $P_{2302} = (13, 14, 7, 1)$ lies on line ℓ_4
59 : $P_{2339} = (2, 1, 8, 1)$ lies on line ℓ_2
60 : $P_{2340} = (3, 1, 8, 1)$ lies on line ℓ_3
61 : $P_{2404} = (3, 5, 8, 1)$ lies on line ℓ_5
62 : $P_{2515} = (2, 12, 8, 1)$ lies on line ℓ_4
63 : $P_{2595} = (2, 1, 9, 1)$ lies on line ℓ_3
64 : $P_{2596} = (3, 1, 9, 1)$ lies on line ℓ_2
65 : $P_{2676} = (3, 6, 9, 1)$ lies on line ℓ_4
66 : $P_{2803} = (2, 14, 9, 1)$ lies on line ℓ_5
67 : $P_{2850} = (1, 1, 10, 1)$ lies on line ℓ_3
68 : $P_{2994} = (1, 10, 10, 1)$ lies on line ℓ_5
69 : $P_{3106} = (1, 1, 11, 1)$ lies on line ℓ_2
70 : $P_{3266} = (1, 11, 11, 1)$ lies on line ℓ_4
71 : $P_{3367} = (6, 1, 12, 1)$ lies on line ℓ_2
72 : $P_{3368} = (7, 1, 12, 1)$ lies on line ℓ_3
73 : $P_{3384} = (7, 2, 12, 1)$ lies on line ℓ_5
74 : $P_{3591} = (6, 15, 12, 1)$ lies on line ℓ_4
75 : $P_{3623} = (6, 1, 13, 1)$ lies on line ℓ_3
76 : $P_{3624} = (7, 1, 13, 1)$ lies on line ℓ_2
77 : $P_{3688} = (7, 5, 13, 1)$ lies on line ℓ_4
78 : $P_{3751} = (6, 9, 13, 1)$ lies on line ℓ_5
79 : $P_{3877} = (4, 1, 14, 1)$ lies on line ℓ_2
80 : $P_{3878} = (5, 1, 14, 1)$ lies on line ℓ_3
81 : $P_{3893} = (4, 2, 14, 1)$ lies on line ℓ_4
82 : $P_{4070} = (5, 13, 14, 1)$ lies on line ℓ_5
83 : $P_{4133} = (4, 1, 15, 1)$ lies on line ℓ_3
84 : $P_{4134} = (5, 1, 15, 1)$ lies on line ℓ_2
85 : $P_{4213} = (4, 6, 15, 1)$ lies on line ℓ_5
86 : $P_{4246} = (5, 8, 15, 1)$ lies on line ℓ_4

The single points on the surface are:

Points on surface but on no line

The surface has 211 points not on any line:
The points on the surface but not on lines are:

0 : $P_3 = (0, 0, 0, 1)$
1 : $P_{59} = (8, 2, 1, 0)$
2 : $P_{79} = (12, 3, 1, 0)$
3 : $P_{98} = (15, 4, 1, 0)$
4 : $P_{105} = (6, 5, 1, 0)$
5 : $P_{129} = (14, 6, 1, 0)$
6 : $P_{135} = (4, 7, 1, 0)$
7 : $P_{160} = (13, 8, 1, 0)$
8 : $P_{166} = (3, 9, 1, 0)$
9 : $P_{189} = (10, 10, 1, 0)$
10 : $P_{206} = (11, 11, 1, 0)$
11 : $P_{220} = (9, 12, 1, 0)$
12 : $P_{229} = (2, 13, 1, 0)$
13 : $P_{248} = (5, 14, 1, 0)$
14 : $P_{266} = (7, 15, 1, 0)$
15 : $P_{435} = (1, 10, 0, 1)$
16 : $P_{451} = (1, 11, 0, 1)$
17 : $P_{633} = (8, 6, 1, 1)$
18 : $P_{634} = (9, 6, 1, 1)$
19 : $P_{643} = (2, 7, 1, 1)$
20 : $P_{644} = (3, 7, 1, 1)$
21 : $P_{695} = (6, 10, 1, 1)$
22 : $P_{696} = (7, 10, 1, 1)$
23 : $P_{717} = (12, 11, 1, 1)$
24 : $P_{718} = (13, 11, 1, 1)$
25 : $P_{725} = (4, 12, 1, 1)$
26 : $P_{726} = (5, 12, 1, 1)$
27 : $P_{751} = (14, 13, 1, 1)$
28 : $P_{752} = (15, 13, 1, 1)$
29 : $P_{828} = (11, 2, 2, 1)$

30 : $P_{855} = (6, 4, 2, 1)$
31 : $P_{865} = (0, 5, 2, 1)$
32 : $P_{871} = (6, 5, 2, 1)$
33 : $P_{908} = (11, 7, 2, 1)$
34 : $P_{917} = (4, 8, 2, 1)$
35 : $P_{923} = (10, 8, 2, 1)$
36 : $P_{933} = (4, 9, 2, 1)$
37 : $P_{944} = (15, 9, 2, 1)$
38 : $P_{978} = (1, 12, 2, 1)$
39 : $P_{998} = (5, 13, 2, 1)$
40 : $P_{1008} = (15, 13, 2, 1)$
41 : $P_{1011} = (2, 14, 2, 1)$
42 : $P_{1019} = (10, 14, 2, 1)$
43 : $P_{1026} = (1, 15, 2, 1)$
44 : $P_{1030} = (5, 15, 2, 1)$
45 : $P_{1103} = (14, 3, 3, 1)$
46 : $P_{1107} = (2, 4, 3, 1)$
47 : $P_{1116} = (11, 4, 3, 1)$
48 : $P_{1139} = (2, 6, 3, 1)$
49 : $P_{1152} = (15, 6, 3, 1)$
50 : $P_{1169} = (0, 8, 3, 1)$
51 : $P_{1212} = (11, 10, 3, 1)$
52 : $P_{1215} = (14, 10, 3, 1)$
53 : $P_{1264} = (15, 13, 3, 1)$
54 : $P_{1284} = (3, 15, 3, 1)$
55 : $P_{1333} = (4, 2, 4, 1)$
56 : $P_{1340} = (11, 2, 4, 1)$
57 : $P_{1346} = (1, 3, 4, 1)$
58 : $P_{1353} = (8, 3, 4, 1)$
59 : $P_{1371} = (10, 4, 4, 1)$
60 : $P_{1394} = (1, 6, 4, 1)$
61 : $P_{1412} = (3, 7, 4, 1)$
62 : $P_{1417} = (8, 7, 4, 1)$
63 : $P_{1425} = (0, 8, 4, 1)$
64 : $P_{1438} = (13, 8, 4, 1)$
65 : $P_{1454} = (13, 9, 4, 1)$
66 : $P_{1499} = (10, 12, 4, 1)$
67 : $P_{1524} = (3, 14, 4, 1)$
68 : $P_{1530} = (9, 14, 4, 1)$
69 : $P_{1546} = (9, 15, 4, 1)$
70 : $P_{1548} = (11, 15, 4, 1)$
71 : $P_{1606} = (5, 3, 5, 1)$
72 : $P_{1635} = (2, 5, 5, 1)$
73 : $P_{1668} = (3, 7, 5, 1)$
74 : $P_{1701} = (4, 9, 5, 1)$
75 : $P_{1707} = (10, 9, 5, 1)$
76 : $P_{1731} = (2, 11, 5, 1)$
77 : $P_{1739} = (10, 11, 5, 1)$
78 : $P_{1764} = (3, 13, 5, 1)$
79 : $P_{1765} = (4, 13, 5, 1)$
80 : $P_{1793} = (0, 15, 5, 1)$
81 : $P_{1820} = (11, 0, 6, 1)$
82 : $P_{1824} = (15, 0, 6, 1)$
83 : $P_{1852} = (11, 2, 6, 1)$
84 : $P_{1855} = (14, 2, 6, 1)$
85 : $P_{1857} = (0, 3, 6, 1)$
86 : $P_{1914} = (9, 6, 6, 1)$
87 : $P_{1923} = (2, 7, 6, 1)$
88 : $P_{1929} = (8, 7, 6, 1)$
89 : $P_{1977} = (8, 10, 6, 1)$
90 : $P_{1984} = (15, 10, 6, 1)$
91 : $P_{2007} = (6, 12, 6, 1)$
92 : $P_{2010} = (9, 12, 6, 1)$
93 : $P_{2051} = (2, 15, 6, 1)$
94 : $P_{2063} = (14, 15, 6, 1)$
95 : $P_{2070} = (5, 0, 7, 1)$
96 : $P_{2076} = (11, 0, 7, 1)$
97 : $P_{2149} = (4, 5, 7, 1)$
98 : $P_{2154} = (9, 5, 7, 1)$
99 : $P_{2164} = (3, 6, 7, 1)$
100 : $P_{2170} = (9, 6, 7, 1)$
101 : $P_{2179} = (2, 7, 7, 1)$
102 : $P_{2193} = (0, 8, 7, 1)$
103 : $P_{2213} = (4, 9, 7, 1)$
104 : $P_{2220} = (11, 9, 7, 1)$
105 : $P_{2228} = (3, 10, 7, 1)$
106 : $P_{2230} = (5, 10, 7, 1)$
107 : $P_{2275} = (2, 13, 7, 1)$
108 : $P_{2280} = (7, 13, 7, 1)$
109 : $P_{2369} = (0, 3, 8, 1)$
110 : $P_{2409} = (8, 5, 8, 1)$
111 : $P_{2438} = (5, 7, 8, 1)$
112 : $P_{2442} = (9, 7, 8, 1)$
113 : $P_{2453} = (4, 8, 8, 1)$
114 : $P_{2485} = (4, 10, 8, 1)$
115 : $P_{2492} = (11, 10, 8, 1)$
116 : $P_{2518} = (5, 12, 8, 1)$
117 : $P_{2554} = (9, 14, 8, 1)$
118 : $P_{2556} = (11, 14, 8, 1)$
119 : $P_{2614} = (5, 2, 9, 1)$
120 : $P_{2623} = (14, 2, 9, 1)$
121 : $P_{2635} = (10, 3, 9, 1)$
122 : $P_{2639} = (14, 3, 9, 1)$
123 : $P_{2650} = (9, 4, 9, 1)$
124 : $P_{2651} = (10, 4, 9, 1)$
125 : $P_{2658} = (1, 5, 9, 1)$
126 : $P_{2672} = (15, 5, 9, 1)$
127 : $P_{2684} = (11, 6, 9, 1)$
128 : $P_{2732} = (11, 9, 9, 1)$
129 : $P_{2774} = (5, 12, 9, 1)$
130 : $P_{2784} = (15, 12, 9, 1)$
131 : $P_{2786} = (1, 13, 9, 1)$
132 : $P_{2808} = (7, 14, 9, 1)$
133 : $P_{2817} = (0, 15, 9, 1)$
134 : $P_{2824} = (7, 15, 9, 1)$
135 : $P_{2835} = (2, 0, 10, 1)$
136 : $P_{2842} = (9, 0, 10, 1)$
137 : $P_{2869} = (4, 2, 10, 1)$

138 : $P_{2874} = (9, 2, 10, 1)$
139 : $P_{2892} = (11, 3, 10, 1)$
140 : $P_{2895} = (14, 3, 10, 1)$
141 : $P_{2965} = (4, 8, 10, 1)$
142 : $P_{2972} = (11, 8, 10, 1)$
143 : $P_{2979} = (2, 9, 10, 1)$
144 : $P_{2991} = (14, 9, 10, 1)$
145 : $P_{3019} = (10, 11, 10, 1)$
146 : $P_{3093} = (4, 0, 11, 1)$
147 : $P_{3103} = (14, 0, 11, 1)$
148 : $P_{3162} = (9, 4, 11, 1)$
149 : $P_{3167} = (14, 4, 11, 1)$
150 : $P_{3171} = (2, 5, 11, 1)$
151 : $P_{3179} = (10, 5, 11, 1)$
152 : $P_{3260} = (11, 10, 11, 1)$
153 : $P_{3315} = (2, 14, 11, 1)$
154 : $P_{3317} = (4, 14, 11, 1)$
155 : $P_{3338} = (9, 15, 11, 1)$
156 : $P_{3339} = (10, 15, 11, 1)$
157 : $P_{3353} = (8, 0, 12, 1)$
158 : $P_{3355} = (10, 0, 12, 1)$
159 : $P_{3461} = (4, 7, 12, 1)$
160 : $P_{3469} = (12, 7, 12, 1)$
161 : $P_{3482} = (9, 8, 12, 1)$
162 : $P_{3487} = (14, 8, 12, 1)$
163 : $P_{3526} = (5, 11, 12, 1)$
164 : $P_{3529} = (8, 11, 12, 1)$
165 : $P_{3541} = (4, 12, 12, 1)$
166 : $P_{3558} = (5, 13, 12, 1)$
167 : $P_{3567} = (14, 13, 12, 1)$
168 : $P_{3578} = (9, 14, 12, 1)$
169 : $P_{3579} = (10, 14, 12, 1)$
170 : $P_{3585} = (0, 15, 12, 1)$
171 : $P_{3604} = (3, 0, 13, 1)$
172 : $P_{3611} = (10, 0, 13, 1)$
173 : $P_{3651} = (2, 3, 13, 1)$
174 : $P_{3653} = (4, 3, 13, 1)$
175 : $P_{3667} = (2, 4, 13, 1)$
176 : $P_{3675} = (10, 4, 13, 1)$
177 : $P_{3681} = (0, 5, 13, 1)$
178 : $P_{3710} = (13, 6, 13, 1)$
179 : $P_{3711} = (14, 6, 13, 1)$
180 : $P_{3780} = (3, 11, 13, 1)$
181 : $P_{3792} = (15, 11, 13, 1)$
182 : $P_{3797} = (4, 12, 13, 1)$
183 : $P_{3808} = (15, 12, 13, 1)$
184 : $P_{3823} = (14, 13, 13, 1)$
185 : $P_{3901} = (12, 2, 14, 1)$
186 : $P_{3905} = (0, 3, 14, 1)$
187 : $P_{3917} = (12, 3, 14, 1)$
188 : $P_{3923} = (2, 4, 14, 1)$
189 : $P_{3929} = (8, 4, 14, 1)$
190 : $P_{3939} = (2, 5, 14, 1)$
191 : $P_{3948} = (11, 5, 14, 1)$
192 : $P_{3956} = (3, 6, 14, 1)$
193 : $P_{3961} = (8, 6, 14, 1)$
194 : $P_{3970} = (1, 7, 14, 1)$
195 : $P_{3986} = (1, 8, 14, 1)$
196 : $P_{3988} = (3, 8, 14, 1)$
197 : $P_{4012} = (11, 9, 14, 1)$
198 : $P_{4015} = (14, 9, 14, 1)$
199 : $P_{4075} = (10, 13, 14, 1)$
200 : $P_{4091} = (10, 14, 14, 1)$
201 : $P_{4155} = (10, 2, 15, 1)$
202 : $P_{4159} = (14, 2, 15, 1)$
203 : $P_{4193} = (0, 5, 15, 1)$
204 : $P_{4217} = (8, 6, 15, 1)$
205 : $P_{4256} = (15, 8, 15, 1)$
206 : $P_{4298} = (9, 11, 15, 1)$
207 : $P_{4299} = (10, 11, 15, 1)$
208 : $P_{4313} = (8, 12, 15, 1)$
209 : $P_{4319} = (14, 12, 15, 1)$
210 : $P_{4362} = (9, 15, 15, 1)$

Line Intersection Graph

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

Neighbor sets in the line intersection graph:
Line 0 intersects

Line	ℓ_2	ℓ_3	ℓ_4	ℓ_5
in point	P_{20}	P_{20}	P_{180}	P_{196}

Line 1 intersects

Line	ℓ_2	ℓ_3
in point	P_{556}	P_{555}

Line 2 intersects

Line	ℓ_0	ℓ_1	ℓ_3	ℓ_4
in point	P_{20}	P_{556}	P_{20}	P_{2849}

Line 3 intersects

Line	ℓ_0	ℓ_1	ℓ_2	ℓ_5
in point	P_{20}	P_{555}	P_{20}	P_{3105}

Line 4 intersects

Line	ℓ_0	ℓ_2
in point	P_{180}	P_{2849}

Line 5 intersects

Line	ℓ_0	ℓ_3
in point	P_{196}	P_{3105}

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 : $P_3 = (0,0,0,1)$
3 : $P_4 = (1,1,1,1)$
4 : $P_{20} = (1,0,1,0)$
5 : $P_{36} = (1,1,1,0)$
6 : $P_{52} = (1,2,1,0)$
7 : $P_{59} = (8,2,1,0)$
8 : $P_{68} = (1,3,1,0)$
9 : $P_{79} = (12,3,1,0)$
10 : $P_{84} = (1,4,1,0)$
11 : $P_{98} = (15,4,1,0)$
12 : $P_{100} = (1,5,1,0)$
13 : $P_{105} = (6,5,1,0)$
14 : $P_{116} = (1,6,1,0)$
15 : $P_{129} = (14,6,1,0)$
16 : $P_{132} = (1,7,1,0)$
17 : $P_{135} = (4,7,1,0)$
18 : $P_{148} = (1,8,1,0)$
19 : $P_{160} = (13,8,1,0)$
20 : $P_{164} = (1,9,1,0)$
21 : $P_{166} = (3,9,1,0)$
22 : $P_{180} = (1,10,1,0)$
23 : $P_{189} = (10,10,1,0)$
24 : $P_{196} = (1,11,1,0)$
25 : $P_{206} = (11,11,1,0)$
26 : $P_{212} = (1,12,1,0)$
27 : $P_{220} = (9,12,1,0)$
28 : $P_{228} = (1,13,1,0)$
29 : $P_{229} = (2,13,1,0)$
30 : $P_{244} = (1,14,1,0)$
31 : $P_{248} = (5,14,1,0)$
32 : $P_{260} = (1,15,1,0)$
33 : $P_{266} = (7,15,1,0)$
34 : $P_{300} = (10,1,0,1)$
35 : $P_{301} = (11,1,0,1)$
36 : $P_{435} = (1,10,0,1)$
37 : $P_{444} = (10,10,0,1)$
38 : $P_{451} = (1,11,0,1)$
39 : $P_{461} = (11,11,0,1)$
40 : $P_{540} = (10,0,1,1)$
41 : $P_{541} = (11,0,1,1)$
42 : $P_{546} = (0,1,1,1)$
43 : $P_{547} = (2,1,1,1)$
44 : $P_{548} = (3,1,1,1)$
45 : $P_{549} = (4,1,1,1)$
46 : $P_{550} = (5,1,1,1)$
47 : $P_{551} = (6,1,1,1)$
48 : $P_{552} = (7,1,1,1)$
49 : $P_{553} = (8,1,1,1)$
50 : $P_{554} = (9,1,1,1)$
51 : $P_{555} = (10,1,1,1)$
52 : $P_{556} = (11,1,1,1)$
53 : $P_{557} = (12,1,1,1)$
54 : $P_{558} = (13,1,1,1)$
55 : $P_{559} = (14,1,1,1)$
56 : $P_{560} = (15,1,1,1)$
57 : $P_{633} = (8,6,1,1)$
58 : $P_{634} = (9,6,1,1)$
59 : $P_{643} = (2,7,1,1)$
60 : $P_{644} = (3,7,1,1)$
61 : $P_{695} = (6,10,1,1)$
62 : $P_{696} = (7,10,1,1)$
63 : $P_{717} = (12,11,1,1)$
64 : $P_{718} = (13,11,1,1)$
65 : $P_{725} = (4,12,1,1)$
66 : $P_{726} = (5,12,1,1)$
67 : $P_{751} = (14,13,1,1)$
68 : $P_{752} = (15,13,1,1)$
69 : $P_{809} = (8,1,2,1)$
70 : $P_{810} = (9,1,2,1)$
71 : $P_{828} = (11,2,2,1)$
72 : $P_{855} = (6,4,2,1)$
73 : $P_{858} = (9,4,2,1)$
74 : $P_{865} = (0,5,2,1)$
75 : $P_{871} = (6,5,2,1)$
76 : $P_{905} = (8,7,2,1)$
77 : $P_{908} = (11,7,2,1)$
78 : $P_{917} = (4,8,2,1)$
79 : $P_{923} = (10,8,2,1)$
80 : $P_{933} = (4,9,2,1)$
81 : $P_{944} = (15,9,2,1)$
82 : $P_{978} = (1,12,2,1)$
83 : $P_{998} = (5,13,2,1)$
84 : $P_{1008} = (15,13,2,1)$
85 : $P_{1011} = (2,14,2,1)$
86 : $P_{1019} = (10,14,2,1)$
87 : $P_{1026} = (1,15,2,1)$
88 : $P_{1030} = (5,15,2,1)$
89 : $P_{1065} = (8,1,3,1)$
90 : $P_{1066} = (9,1,3,1)$
91 : $P_{1103} = (14,3,3,1)$
92 : $P_{1107} = (2,4,3,1)$
93 : $P_{1116} = (11,4,3,1)$
94 : $P_{1139} = (2,6,3,1)$
95 : $P_{1152} = (15,6,3,1)$
96 : $P_{1169} = (0,8,3,1)$
97 : $P_{1212} = (11,10,3,1)$
98 : $P_{1215} = (14,10,3,1)$
99 : $P_{1258} = (9,13,3,1)$
100 : $P_{1264} = (15,13,3,1)$
101 : $P_{1284} = (3,15,3,1)$
102 : $P_{1289} = (8,15,3,1)$
103 : $P_{1327} = (14,1,4,1)$
104 : $P_{1328} = (15,1,4,1)$
105 : $P_{1333} = (4,2,4,1)$
106 : $P_{1340} = (11,2,4,1)$
107 : $P_{1346} = (1,3,4,1)$
108 : $P_{1353} = (8,3,4,1)$
109 : $P_{1371} = (10,4,4,1)$
110 : $P_{1394} = (1,6,4,1)$

111 : $P_{1412} = (3, 7, 4, 1)$
112 : $P_{1417} = (8, 7, 4, 1)$
113 : $P_{1425} = (0, 8, 4, 1)$
114 : $P_{1438} = (13, 8, 4, 1)$
115 : $P_{1454} = (13, 9, 4, 1)$
116 : $P_{1455} = (14, 9, 4, 1)$
117 : $P_{1499} = (10, 12, 4, 1)$
118 : $P_{1504} = (15, 12, 4, 1)$
119 : $P_{1524} = (3, 14, 4, 1)$
120 : $P_{1530} = (9, 14, 4, 1)$
121 : $P_{1546} = (9, 15, 4, 1)$
122 : $P_{1548} = (11, 15, 4, 1)$
123 : $P_{1583} = (14, 1, 5, 1)$
124 : $P_{1584} = (15, 1, 5, 1)$
125 : $P_{1606} = (5, 3, 5, 1)$
126 : $P_{1616} = (15, 3, 5, 1)$
127 : $P_{1635} = (2, 5, 5, 1)$
128 : $P_{1668} = (3, 7, 5, 1)$
129 : $P_{1679} = (14, 7, 5, 1)$
130 : $P_{1701} = (4, 9, 5, 1)$
131 : $P_{1707} = (10, 9, 5, 1)$
132 : $P_{1731} = (2, 11, 5, 1)$
133 : $P_{1739} = (10, 11, 5, 1)$
134 : $P_{1764} = (3, 13, 5, 1)$
135 : $P_{1765} = (4, 13, 5, 1)$
136 : $P_{1793} = (0, 15, 5, 1)$
137 : $P_{1820} = (11, 0, 6, 1)$
138 : $P_{1824} = (15, 0, 6, 1)$
139 : $P_{1837} = (12, 1, 6, 1)$
140 : $P_{1838} = (13, 1, 6, 1)$
141 : $P_{1852} = (11, 2, 6, 1)$
142 : $P_{1855} = (14, 2, 6, 1)$
143 : $P_{1857} = (0, 3, 6, 1)$
144 : $P_{1870} = (13, 3, 6, 1)$
145 : $P_{1885} = (12, 4, 6, 1)$
146 : $P_{1914} = (9, 6, 6, 1)$
147 : $P_{1923} = (2, 7, 6, 1)$
148 : $P_{1929} = (8, 7, 6, 1)$
149 : $P_{1977} = (8, 10, 6, 1)$
150 : $P_{1984} = (15, 10, 6, 1)$
151 : $P_{2007} = (6, 12, 6, 1)$
152 : $P_{2010} = (9, 12, 6, 1)$
153 : $P_{2051} = (2, 15, 6, 1)$
154 : $P_{2063} = (14, 15, 6, 1)$
155 : $P_{2070} = (5, 0, 7, 1)$
156 : $P_{2076} = (11, 0, 7, 1)$
157 : $P_{2093} = (12, 1, 7, 1)$
158 : $P_{2094} = (13, 1, 7, 1)$
159 : $P_{2149} = (4, 5, 7, 1)$
160 : $P_{2154} = (9, 5, 7, 1)$
161 : $P_{2164} = (3, 6, 7, 1)$
162 : $P_{2170} = (9, 6, 7, 1)$
163 : $P_{2179} = (2, 7, 7, 1)$
164 : $P_{2193} = (0, 8, 7, 1)$
165 : $P_{2205} = (12, 8, 7, 1)$
166 : $P_{2213} = (4, 9, 7, 1)$
167 : $P_{2220} = (11, 9, 7, 1)$
168 : $P_{2228} = (3, 10, 7, 1)$
169 : $P_{2230} = (5, 10, 7, 1)$
170 : $P_{2275} = (2, 13, 7, 1)$
171 : $P_{2280} = (7, 13, 7, 1)$
172 : $P_{2302} = (13, 14, 7, 1)$
173 : $P_{2339} = (2, 1, 8, 1)$
174 : $P_{2340} = (3, 1, 8, 1)$
175 : $P_{2369} = (0, 3, 8, 1)$
176 : $P_{2404} = (3, 5, 8, 1)$
177 : $P_{2409} = (8, 5, 8, 1)$
178 : $P_{2438} = (5, 7, 8, 1)$
179 : $P_{2442} = (9, 7, 8, 1)$
180 : $P_{2453} = (4, 8, 8, 1)$
181 : $P_{2485} = (4, 10, 8, 1)$
182 : $P_{2492} = (11, 10, 8, 1)$
183 : $P_{2515} = (2, 12, 8, 1)$
184 : $P_{2518} = (5, 12, 8, 1)$
185 : $P_{2554} = (9, 14, 8, 1)$
186 : $P_{2556} = (11, 14, 8, 1)$
187 : $P_{2595} = (2, 1, 9, 1)$
188 : $P_{2596} = (3, 1, 9, 1)$
189 : $P_{2614} = (5, 2, 9, 1)$
190 : $P_{2623} = (14, 2, 9, 1)$
191 : $P_{2635} = (10, 3, 9, 1)$
192 : $P_{2639} = (14, 3, 9, 1)$
193 : $P_{2650} = (9, 4, 9, 1)$
194 : $P_{2651} = (10, 4, 9, 1)$
195 : $P_{2658} = (1, 5, 9, 1)$
196 : $P_{2672} = (15, 5, 9, 1)$
197 : $P_{2676} = (3, 6, 9, 1)$
198 : $P_{2684} = (11, 6, 9, 1)$
199 : $P_{2732} = (11, 9, 9, 1)$
200 : $P_{2774} = (5, 12, 9, 1)$
201 : $P_{2784} = (15, 12, 9, 1)$
202 : $P_{2786} = (1, 13, 9, 1)$
203 : $P_{2803} = (2, 14, 9, 1)$
204 : $P_{2808} = (7, 14, 9, 1)$
205 : $P_{2817} = (0, 15, 9, 1)$
206 : $P_{2824} = (7, 15, 9, 1)$
207 : $P_{2835} = (2, 0, 10, 1)$
208 : $P_{2842} = (9, 0, 10, 1)$
209 : $P_{2849} = (0, 1, 10, 1)$
210 : $P_{2850} = (1, 1, 10, 1)$
211 : $P_{2869} = (4, 2, 10, 1)$
212 : $P_{2874} = (9, 2, 10, 1)$
213 : $P_{2892} = (11, 3, 10, 1)$
214 : $P_{2895} = (14, 3, 10, 1)$
215 : $P_{2965} = (4, 8, 10, 1)$
216 : $P_{2972} = (11, 8, 10, 1)$
217 : $P_{2979} = (2, 9, 10, 1)$
218 : $P_{2991} = (14, 9, 10, 1)$
219 : $P_{2994} = (1, 10, 10, 1)$
220 : $P_{3019} = (10, 11, 10, 1)$
221 : $P_{3093} = (4, 0, 11, 1)$
222 : $P_{3103} = (14, 0, 11, 1)$
223 : $P_{3105} = (0, 1, 11, 1)$
224 : $P_{3106} = (1, 1, 11, 1)$
225 : $P_{3162} = (9, 4, 11, 1)$
226 : $P_{3167} = (14, 4, 11, 1)$
227 : $P_{3171} = (2, 5, 11, 1)$
228 : $P_{3179} = (10, 5, 11, 1)$
229 : $P_{3260} = (11, 10, 11, 1)$
230 : $P_{3266} = (1, 11, 11, 1)$
231 : $P_{3315} = (2, 14, 11, 1)$
232 : $P_{3317} = (4, 14, 11, 1)$
233 : $P_{3338} = (9, 15, 11, 1)$
234 : $P_{3339} = (10, 15, 11, 1)$
235 : $P_{3353} = (8, 0, 12, 1)$
236 : $P_{3355} = (10, 0, 12, 1)$
237 : $P_{3367} = (6, 1, 12, 1)$
238 : $P_{3368} = (7, 1, 12, 1)$
239 : $P_{3384} = (7, 2, 12, 1)$
240 : $P_{3461} = (4, 7, 12, 1)$
241 : $P_{3469} = (12, 7, 12, 1)$
242 : $P_{3482} = (9, 8, 12, 1)$
243 : $P_{3487} = (14, 8, 12, 1)$
244 : $P_{3526} = (5, 11, 12, 1)$
245 : $P_{3529} = (8, 11, 12, 1)$
246 : $P_{3541} = (4, 12, 12, 1)$
247 : $P_{3558} = (5, 13, 12, 1)$
248 : $P_{3567} = (14, 13, 12, 1)$
249 : $P_{3578} = (9, 14, 12, 1)$
250 : $P_{3579} = (10, 14, 12, 1)$
251 : $P_{3585} = (0, 15, 12, 1)$
252 : $P_{3591} = (6, 15, 12, 1)$
253 : $P_{3604} = (3, 0, 13, 1)$
254 : $P_{3611} = (10, 0, 13, 1)$
255 : $P_{3623} = (6, 1, 13, 1)$
256 : $P_{3624} = (7, 1, 13, 1)$
257 : $P_{3651} = (2, 3, 13, 1)$
258 : $P_{3653} = (4, 3, 13, 1)$
259 : $P_{3667} = (2, 4, 13, 1)$
260 : $P_{3675} = (10, 4, 13, 1)$
261 : $P_{3681} = (0, 5, 13, 1)$
262 : $P_{3688} = (7, 5, 13, 1)$
263 : $P_{3710} = (13, 6, 13, 1)$
264 : $P_{3711} = (14, 6, 13, 1)$
265 : $P_{3751} = (6, 9, 13, 1)$
266 : $P_{3780} = (3, 11, 13, 1)$
267 : $P_{3792} = (15, 11, 13, 1)$
268 : $P_{3797} = (4, 12, 13, 1)$
269 : $P_{3808} = (15, 12, 13, 1)$
270 : $P_{3823} = (14, 13, 13, 1)$
271 : $P_{3877} = (4, 1, 14, 1)$
272 : $P_{3878} = (5, 1, 14, 1)$

$273: P_{3893} = (4, 2, 14, 1)$
$274: P_{3901} = (12, 2, 14, 1)$
$275: P_{3905} = (0, 3, 14, 1)$
$276: P_{3917} = (12, 3, 14, 1)$
$277: P_{3923} = (2, 4, 14, 1)$
$278: P_{3929} = (8, 4, 14, 1)$
$279: P_{3939} = (2, 5, 14, 1)$
$280: P_{3948} = (11, 5, 14, 1)$
$281: P_{3956} = (3, 6, 14, 1)$
$282: P_{3961} = (8, 6, 14, 1)$
$283: P_{3970} = (1, 7, 14, 1)$
$284: P_{3986} = (1, 8, 14, 1)$
$285: P_{3988} = (3, 8, 14, 1)$
$286: P_{4012} = (11, 9, 14, 1)$
$287: P_{4015} = (14, 9, 14, 1)$
$288: P_{4070} = (5, 13, 14, 1)$
$289: P_{4075} = (10, 13, 14, 1)$
$290: P_{4091} = (10, 14, 14, 1)$
$291: P_{4133} = (4, 1, 15, 1)$
$292: P_{4134} = (5, 1, 15, 1)$
$293: P_{4155} = (10, 2, 15, 1)$
$294: P_{4159} = (14, 2, 15, 1)$
$295: P_{4193} = (0, 5, 15, 1)$
$296: P_{4213} = (4, 6, 15, 1)$
$297: P_{4217} = (8, 6, 15, 1)$
$298: P_{4246} = (5, 8, 15, 1)$
$299: P_{4256} = (15, 8, 15, 1)$
$300: P_{4298} = (9, 11, 15, 1)$
$301: P_{4299} = (10, 11, 15, 1)$
$302: P_{4313} = (8, 12, 15, 1)$
$303: P_{4319} = (14, 12, 15, 1)$
$304: P_{4362} = (9, 15, 15, 1)$