Rank-74499 over GF(32)

January 15, 2021

The equation

The equation of the surface is :

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

(0, 0, 0, 0, 0, 0, 0, 0, 1, 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	7
Number of points	1121
Number of singular points	2
Number of Eckardt points	1
Number of double points	5
Number of single points	214
Number of points off lines	900
Number of Hesse planes	0
Number of axes	0
Type of points on lines	33^7
Type of lines on points	4, 3, 2^5, 1^{214}, 0^{900}

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 7 Lines

The lines and their Pluecker coordinates are:

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

$$\ell_1 = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 \end{bmatrix}_{1024} = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 \end{bmatrix}_{1024} = \mathbf{Pl}(0,0,1,0,0,0)_2$$

$$\ell_2 = \begin{bmatrix} 1 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \end{bmatrix}_{2081} = \begin{bmatrix} 1 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \end{bmatrix}_{2081} = \mathbf{Pl}(0,0,1,0,0,1)_{34912}$$

$$\ell_3 = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 1 & 1 \end{bmatrix}_{33} = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 1 & 1 \end{bmatrix}_{33} = \mathbf{Pl}(1,0,1,0,1,0)_{1153}$$

$$\ell_4 = \begin{bmatrix} 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 1 \end{bmatrix}_{1082369} = \begin{bmatrix} 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 1 \end{bmatrix}_{1082369} = \mathbf{Pl}(0,0,0,1,0,1)_{36865}$$

$$\ell_5 = \begin{bmatrix} 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{1083424} = \begin{bmatrix} 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{1083424} = \mathbf{Pl}(0,1,0,0,0,0)_1$$

$$\ell_6 = \begin{bmatrix} 1 & 1 & 0 & 1 \\ 0 & 0 & 1 & 0 \end{bmatrix}_{35905} = \begin{bmatrix} 1 & 1 & 0 & 1 \\ 0 & 0 & 1 & 0 \end{bmatrix}_{35905} = \mathbf{Pl}(0,1,1,0,0,1)_{34944}$$

Rank of lines: (0, 1024, 2081, 33, 1082369, 1083424, 35905)
Rank of points on Klein quadric: (0, 2, 34912, 1153, 36865, 1, 34944)

Eckardt Points

The surface has 1 Eckardt points:
$0 : P_0 = \mathbf{P}(1,0,0,0) = \mathbf{P}(1,0,0,0)$.

Double Points

The surface has 5 Double points:
The double points on the surface are:

$P_5 = (1,1,0,0) = \ell_0 \cap \ell_2$
$P_1 = (0,1,0,0) = \ell_0 \cap \ell_4$
$P_{2114} = (0,1,1,1) = \ell_3 \cap \ell_4$
$P_4 = (1,1,1,1) = \ell_3 \cap \ell_6$
$P_{2082} = (0,0,1,1) = \ell_4 \cap \ell_5$

Single Points

The surface has 214 single points:
The single points on the surface are:

$0 : P_3 = (0,0,0,1)$ lies on line ℓ_5
$1 : P_6 = (2,1,0,0)$ lies on line ℓ_0
$2 : P_7 = (3,1,0,0)$ lies on line ℓ_0
$3 : P_8 = (4,1,0,0)$ lies on line ℓ_0
$4 : P_9 = (5,1,0,0)$ lies on line ℓ_0
$5 : P_{10} = (6,1,0,0)$ lies on line ℓ_0
$6 : P_{11} = (7,1,0,0)$ lies on line ℓ_0
$7 : P_{12} = (8,1,0,0)$ lies on line ℓ_0
$8 : P_{13} = (9,1,0,0)$ lies on line ℓ_0
$9 : P_{14} = (10,1,0,0)$ lies on line ℓ_0
$10 : P_{15} = (11,1,0,0)$ 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
$15 : P_{20} = (16,1,0,0)$ lies on line ℓ_0
$16 : P_{21} = (17,1,0,0)$ lies on line ℓ_0
$17 : P_{22} = (18,1,0,0)$ lies on line ℓ_0
$18 : P_{23} = (19,1,0,0)$ lies on line ℓ_0
$19 : P_{24} = (20,1,0,0)$ lies on line ℓ_0
$20 : P_{25} = (21,1,0,0)$ lies on line ℓ_0
$21 : P_{26} = (22,1,0,0)$ lies on line ℓ_0
$22 : P_{27} = (23,1,0,0)$ lies on line ℓ_0
$23 : P_{28} = (24,1,0,0)$ lies on line ℓ_0
$24 : P_{29} = (25,1,0,0)$ lies on line ℓ_0
$25 : P_{30} = (26,1,0,0)$ lies on line ℓ_0

26 : $P_{31} = (27, 1, 0, 0)$ lies on line ℓ_0
27 : $P_{32} = (28, 1, 0, 0)$ lies on line ℓ_0
28 : $P_{33} = (29, 1, 0, 0)$ lies on line ℓ_0
29 : $P_{34} = (30, 1, 0, 0)$ lies on line ℓ_0
30 : $P_{35} = (31, 1, 0, 0)$ lies on line ℓ_0
31 : $P_{36} = (1, 0, 1, 0)$ lies on line ℓ_1
32 : $P_{37} = (2, 0, 1, 0)$ lies on line ℓ_1
33 : $P_{38} = (3, 0, 1, 0)$ lies on line ℓ_1
34 : $P_{39} = (4, 0, 1, 0)$ lies on line ℓ_1
35 : $P_{40} = (5, 0, 1, 0)$ lies on line ℓ_1
36 : $P_{41} = (6, 0, 1, 0)$ lies on line ℓ_1
37 : $P_{42} = (7, 0, 1, 0)$ lies on line ℓ_1
38 : $P_{43} = (8, 0, 1, 0)$ lies on line ℓ_1
39 : $P_{44} = (9, 0, 1, 0)$ lies on line ℓ_1
40 : $P_{45} = (10, 0, 1, 0)$ lies on line ℓ_1
41 : $P_{46} = (11, 0, 1, 0)$ lies on line ℓ_1
42 : $P_{47} = (12, 0, 1, 0)$ lies on line ℓ_1
43 : $P_{48} = (13, 0, 1, 0)$ lies on line ℓ_1
44 : $P_{49} = (14, 0, 1, 0)$ lies on line ℓ_1
45 : $P_{50} = (15, 0, 1, 0)$ lies on line ℓ_1
46 : $P_{51} = (16, 0, 1, 0)$ lies on line ℓ_1
47 : $P_{52} = (17, 0, 1, 0)$ lies on line ℓ_1
48 : $P_{53} = (18, 0, 1, 0)$ lies on line ℓ_1
49 : $P_{54} = (19, 0, 1, 0)$ lies on line ℓ_1
50 : $P_{55} = (20, 0, 1, 0)$ lies on line ℓ_1
51 : $P_{56} = (21, 0, 1, 0)$ lies on line ℓ_1
52 : $P_{57} = (22, 0, 1, 0)$ lies on line ℓ_1
53 : $P_{58} = (23, 0, 1, 0)$ lies on line ℓ_1
54 : $P_{59} = (24, 0, 1, 0)$ lies on line ℓ_1
55 : $P_{60} = (25, 0, 1, 0)$ lies on line ℓ_1
56 : $P_{61} = (26, 0, 1, 0)$ lies on line ℓ_1
57 : $P_{62} = (27, 0, 1, 0)$ lies on line ℓ_1
58 : $P_{63} = (28, 0, 1, 0)$ lies on line ℓ_1
59 : $P_{64} = (29, 0, 1, 0)$ lies on line ℓ_1
60 : $P_{65} = (30, 0, 1, 0)$ lies on line ℓ_1
61 : $P_{66} = (31, 0, 1, 0)$ lies on line ℓ_1
62 : $P_{68} = (1, 1, 1, 0)$ lies on line ℓ_2
63 : $P_{101} = (2, 2, 1, 0)$ lies on line ℓ_2
64 : $P_{134} = (3, 3, 1, 0)$ lies on line ℓ_2
65 : $P_{167} = (4, 4, 1, 0)$ lies on line ℓ_2
66 : $P_{200} = (5, 5, 1, 0)$ lies on line ℓ_2
67 : $P_{233} = (6, 6, 1, 0)$ lies on line ℓ_2
68 : $P_{266} = (7, 7, 1, 0)$ lies on line ℓ_2
69 : $P_{299} = (8, 8, 1, 0)$ lies on line ℓ_2
70 : $P_{332} = (9, 9, 1, 0)$ lies on line ℓ_2
71 : $P_{365} = (10, 10, 1, 0)$ lies on line ℓ_2
72 : $P_{398} = (11, 11, 1, 0)$ lies on line ℓ_2
73 : $P_{431} = (12, 12, 1, 0)$ lies on line ℓ_2
74 : $P_{464} = (13, 13, 1, 0)$ lies on line ℓ_2
75 : $P_{497} = (14, 14, 1, 0)$ lies on line ℓ_2
76 : $P_{530} = (15, 15, 1, 0)$ lies on line ℓ_2
77 : $P_{563} = (16, 16, 1, 0)$ lies on line ℓ_2
78 : $P_{596} = (17, 17, 1, 0)$ lies on line ℓ_2
79 : $P_{629} = (18, 18, 1, 0)$ lies on line ℓ_2
80 : $P_{662} = (19, 19, 1, 0)$ lies on line ℓ_2
81 : $P_{695} = (20, 20, 1, 0)$ lies on line ℓ_2
82 : $P_{728} = (21, 21, 1, 0)$ lies on line ℓ_2
83 : $P_{761} = (22, 22, 1, 0)$ lies on line ℓ_2
84 : $P_{794} = (23, 23, 1, 0)$ lies on line ℓ_2
85 : $P_{827} = (24, 24, 1, 0)$ lies on line ℓ_2
86 : $P_{860} = (25, 25, 1, 0)$ lies on line ℓ_2
87 : $P_{893} = (26, 26, 1, 0)$ lies on line ℓ_2
88 : $P_{926} = (27, 27, 1, 0)$ lies on line ℓ_2
89 : $P_{959} = (28, 28, 1, 0)$ lies on line ℓ_2
90 : $P_{992} = (29, 29, 1, 0)$ lies on line ℓ_2
91 : $P_{1025} = (30, 30, 1, 0)$ lies on line ℓ_2
92 : $P_{1058} = (31, 31, 1, 0)$ lies on line ℓ_2
93 : $P_{1091} = (1, 1, 0, 1)$ lies on line ℓ_6
94 : $P_{2115} = (2, 1, 1, 1)$ lies on line ℓ_3
95 : $P_{2116} = (3, 1, 1, 1)$ lies on line ℓ_3
96 : $P_{2117} = (4, 1, 1, 1)$ lies on line ℓ_3
97 : $P_{2118} = (5, 1, 1, 1)$ lies on line ℓ_3
98 : $P_{2119} = (6, 1, 1, 1)$ lies on line ℓ_3
99 : $P_{2120} = (7, 1, 1, 1)$ lies on line ℓ_3
100 : $P_{2121} = (8, 1, 1, 1)$ lies on line ℓ_3
101 : $P_{2122} = (9, 1, 1, 1)$ lies on line ℓ_3
102 : $P_{2123} = (10, 1, 1, 1)$ lies on line ℓ_3
103 : $P_{2124} = (11, 1, 1, 1)$ lies on line ℓ_3
104 : $P_{2125} = (12, 1, 1, 1)$ lies on line ℓ_3
105 : $P_{2126} = (13, 1, 1, 1)$ lies on line ℓ_3
106 : $P_{2127} = (14, 1, 1, 1)$ lies on line ℓ_3
107 : $P_{2128} = (15, 1, 1, 1)$ lies on line ℓ_3
108 : $P_{2129} = (16, 1, 1, 1)$ lies on line ℓ_3
109 : $P_{2130} = (17, 1, 1, 1)$ lies on line ℓ_3
110 : $P_{2131} = (18, 1, 1, 1)$ lies on line ℓ_3
111 : $P_{2132} = (19, 1, 1, 1)$ lies on line ℓ_3
112 : $P_{2133} = (20, 1, 1, 1)$ lies on line ℓ_3
113 : $P_{2134} = (21, 1, 1, 1)$ lies on line ℓ_3
114 : $P_{2135} = (22, 1, 1, 1)$ lies on line ℓ_3
115 : $P_{2136} = (23, 1, 1, 1)$ lies on line ℓ_3
116 : $P_{2137} = (24, 1, 1, 1)$ lies on line ℓ_3
117 : $P_{2138} = (25, 1, 1, 1)$ lies on line ℓ_3
118 : $P_{2139} = (26, 1, 1, 1)$ lies on line ℓ_3
119 : $P_{2140} = (27, 1, 1, 1)$ lies on line ℓ_3
120 : $P_{2141} = (28, 1, 1, 1)$ lies on line ℓ_3
121 : $P_{2142} = (29, 1, 1, 1)$ lies on line ℓ_3
122 : $P_{2143} = (30, 1, 1, 1)$ lies on line ℓ_3
123 : $P_{2144} = (31, 1, 1, 1)$ lies on line ℓ_3
124 : $P_{2145} = (0, 2, 1, 1)$ lies on line ℓ_4
125 : $P_{2177} = (0, 3, 1, 1)$ lies on line ℓ_4
126 : $P_{2209} = (0, 4, 1, 1)$ lies on line ℓ_4
127 : $P_{2241} = (0, 5, 1, 1)$ lies on line ℓ_4
128 : $P_{2273} = (0, 6, 1, 1)$ lies on line ℓ_4
129 : $P_{2305} = (0, 7, 1, 1)$ lies on line ℓ_4
130 : $P_{2337} = (0, 8, 1, 1)$ lies on line ℓ_4
131 : $P_{2369} = (0, 9, 1, 1)$ lies on line ℓ_4
132 : $P_{2401} = (0, 10, 1, 1)$ lies on line ℓ_4
133 : $P_{2433} = (0, 11, 1, 1)$ lies on line ℓ_4

134 : $P_{2465} = (0, 12, 1, 1)$ lies on line ℓ_4
135 : $P_{2497} = (0, 13, 1, 1)$ lies on line ℓ_4
136 : $P_{2529} = (0, 14, 1, 1)$ lies on line ℓ_4
137 : $P_{2561} = (0, 15, 1, 1)$ lies on line ℓ_4
138 : $P_{2593} = (0, 16, 1, 1)$ lies on line ℓ_4
139 : $P_{2625} = (0, 17, 1, 1)$ lies on line ℓ_4
140 : $P_{2657} = (0, 18, 1, 1)$ lies on line ℓ_4
141 : $P_{2689} = (0, 19, 1, 1)$ lies on line ℓ_4
142 : $P_{2721} = (0, 20, 1, 1)$ lies on line ℓ_4
143 : $P_{2753} = (0, 21, 1, 1)$ lies on line ℓ_4
144 : $P_{2785} = (0, 22, 1, 1)$ lies on line ℓ_4
145 : $P_{2817} = (0, 23, 1, 1)$ lies on line ℓ_4
146 : $P_{2849} = (0, 24, 1, 1)$ lies on line ℓ_4
147 : $P_{2881} = (0, 25, 1, 1)$ lies on line ℓ_4
148 : $P_{2913} = (0, 26, 1, 1)$ lies on line ℓ_4
149 : $P_{2945} = (0, 27, 1, 1)$ lies on line ℓ_4
150 : $P_{2977} = (0, 28, 1, 1)$ lies on line ℓ_4
151 : $P_{3009} = (0, 29, 1, 1)$ lies on line ℓ_4
152 : $P_{3041} = (0, 30, 1, 1)$ lies on line ℓ_4
153 : $P_{3073} = (0, 31, 1, 1)$ lies on line ℓ_4
154 : $P_{3105} = (0, 0, 2, 1)$ lies on line ℓ_5
155 : $P_{3138} = (1, 1, 2, 1)$ lies on line ℓ_6
156 : $P_{4129} = (0, 0, 3, 1)$ lies on line ℓ_5
157 : $P_{4162} = (1, 1, 3, 1)$ lies on line ℓ_6
158 : $P_{5153} = (0, 0, 4, 1)$ lies on line ℓ_5
159 : $P_{5186} = (1, 1, 4, 1)$ lies on line ℓ_6
160 : $P_{6177} = (0, 0, 5, 1)$ lies on line ℓ_5
161 : $P_{6210} = (1, 1, 5, 1)$ lies on line ℓ_6
162 : $P_{7201} = (0, 0, 6, 1)$ lies on line ℓ_5
163 : $P_{7234} = (1, 1, 6, 1)$ lies on line ℓ_6
164 : $P_{8225} = (0, 0, 7, 1)$ lies on line ℓ_5
165 : $P_{8258} = (1, 1, 7, 1)$ lies on line ℓ_6
166 : $P_{9249} = (0, 0, 8, 1)$ lies on line ℓ_5
167 : $P_{9282} = (1, 1, 8, 1)$ lies on line ℓ_6
168 : $P_{10273} = (0, 0, 9, 1)$ lies on line ℓ_5
169 : $P_{10306} = (1, 1, 9, 1)$ lies on line ℓ_6
170 : $P_{11297} = (0, 0, 10, 1)$ lies on line ℓ_5
171 : $P_{11330} = (1, 1, 10, 1)$ lies on line ℓ_6
172 : $P_{12321} = (0, 0, 11, 1)$ lies on line ℓ_5
173 : $P_{12354} = (1, 1, 11, 1)$ lies on line ℓ_6
174 : $P_{13345} = (0, 0, 12, 1)$ lies on line ℓ_5
175 : $P_{13378} = (1, 1, 12, 1)$ lies on line ℓ_6
176 : $P_{14369} = (0, 0, 13, 1)$ lies on line ℓ_5
177 : $P_{14402} = (1, 1, 13, 1)$ lies on line ℓ_6
178 : $P_{15393} = (0, 0, 14, 1)$ lies on line ℓ_5
179 : $P_{15426} = (1, 1, 14, 1)$ lies on line ℓ_6
180 : $P_{16417} = (0, 0, 15, 1)$ lies on line ℓ_5
181 : $P_{16450} = (1, 1, 15, 1)$ lies on line ℓ_6
182 : $P_{17441} = (0, 0, 16, 1)$ lies on line ℓ_5
183 : $P_{17474} = (1, 1, 16, 1)$ lies on line ℓ_6
184 : $P_{18465} = (0, 0, 17, 1)$ lies on line ℓ_5
185 : $P_{18498} = (1, 1, 17, 1)$ lies on line ℓ_6
186 : $P_{19489} = (0, 0, 18, 1)$ lies on line ℓ_5
187 : $P_{19522} = (1, 1, 18, 1)$ lies on line ℓ_6
188 : $P_{20513} = (0, 0, 19, 1)$ lies on line ℓ_5
189 : $P_{20546} = (1, 1, 19, 1)$ lies on line ℓ_6
190 : $P_{21537} = (0, 0, 20, 1)$ lies on line ℓ_5
191 : $P_{21570} = (1, 1, 20, 1)$ lies on line ℓ_6
192 : $P_{22561} = (0, 0, 21, 1)$ lies on line ℓ_5
193 : $P_{22594} = (1, 1, 21, 1)$ lies on line ℓ_6
194 : $P_{23585} = (0, 0, 22, 1)$ lies on line ℓ_5
195 : $P_{23618} = (1, 1, 22, 1)$ lies on line ℓ_6
196 : $P_{24609} = (0, 0, 23, 1)$ lies on line ℓ_5
197 : $P_{24642} = (1, 1, 23, 1)$ lies on line ℓ_6
198 : $P_{25633} = (0, 0, 24, 1)$ lies on line ℓ_5
199 : $P_{25666} = (1, 1, 24, 1)$ lies on line ℓ_6
200 : $P_{26657} = (0, 0, 25, 1)$ lies on line ℓ_5
201 : $P_{26690} = (1, 1, 25, 1)$ lies on line ℓ_6
202 : $P_{27681} = (0, 0, 26, 1)$ lies on line ℓ_5
203 : $P_{27714} = (1, 1, 26, 1)$ lies on line ℓ_6
204 : $P_{28705} = (0, 0, 27, 1)$ lies on line ℓ_5
205 : $P_{28738} = (1, 1, 27, 1)$ lies on line ℓ_6
206 : $P_{29729} = (0, 0, 28, 1)$ lies on line ℓ_5
207 : $P_{29762} = (1, 1, 28, 1)$ lies on line ℓ_6
208 : $P_{30753} = (0, 0, 29, 1)$ lies on line ℓ_5
209 : $P_{30786} = (1, 1, 29, 1)$ lies on line ℓ_6
210 : $P_{31777} = (0, 0, 30, 1)$ lies on line ℓ_5
211 : $P_{31810} = (1, 1, 30, 1)$ lies on line ℓ_6
212 : $P_{32801} = (0, 0, 31, 1)$ lies on line ℓ_5
213 : $P_{32834} = (1, 1, 31, 1)$ lies on line ℓ_6

The single points on the surface are:

Points on surface but on no line

The surface has 900 points not on any line:
The points on the surface but not on lines are:

0 : $P_{1126} = (4, 2, 0, 1)$
1 : $P_{1159} = (5, 3, 0, 1)$
2 : $P_{1202} = (16, 4, 0, 1)$
3 : $P_{1235} = (17, 5, 0, 1)$
4 : $P_{1270} = (20, 6, 0, 1)$
5 : $P_{1303} = (21, 7, 0, 1)$

$6:\ P_{1324} = (10, 8, 0, 1)$
$7:\ P_{1357} = (11, 9, 0, 1)$
$8:\ P_{1392} = (14, 10, 0, 1)$
$9:\ P_{1425} = (15, 11, 0, 1)$
$10:\ P_{1468} = (26, 12, 0, 1)$
$11:\ P_{1501} = (27, 13, 0, 1)$
$12:\ P_{1536} = (30, 14, 0, 1)$
$13:\ P_{1569} = (31, 15, 0, 1)$
$14:\ P_{1583} = (13, 16, 0, 1)$
$15:\ P_{1614} = (12, 17, 0, 1)$
$16:\ P_{1643} = (9, 18, 0, 1)$
$17:\ P_{1674} = (8, 19, 0, 1)$
$18:\ P_{1727} = (29, 20, 0, 1)$
$19:\ P_{1758} = (28, 21, 0, 1)$
$20:\ P_{1787} = (25, 22, 0, 1)$
$21:\ P_{1818} = (24, 23, 0, 1)$
$22:\ P_{1833} = (7, 24, 0, 1)$
$23:\ P_{1864} = (6, 25, 0, 1)$
$24:\ P_{1893} = (3, 26, 0, 1)$
$25:\ P_{1924} = (2, 27, 0, 1)$
$26:\ P_{1977} = (23, 28, 0, 1)$
$27:\ P_{2008} = (22, 29, 0, 1)$
$28:\ P_{2037} = (19, 30, 0, 1)$
$29:\ P_{2068} = (18, 31, 0, 1)$
$30:\ P_{3200} = (31, 2, 2, 1)$
$31:\ P_{3215} = (14, 3, 2, 1)$
$32:\ P_{3263} = (30, 4, 2, 1)$
$33:\ P_{3267} = (2, 5, 2, 1)$
$34:\ P_{3316} = (19, 6, 2, 1)$
$35:\ P_{3348} = (19, 7, 2, 1)$
$36:\ P_{3390} = (29, 8, 2, 1)$
$37:\ P_{3415} = (22, 9, 2, 1)$
$38:\ P_{3438} = (13, 10, 2, 1)$
$39:\ P_{3488} = (31, 11, 2, 1)$
$40:\ P_{3493} = (4, 12, 2, 1)$
$41:\ P_{3524} = (3, 13, 2, 1)$
$42:\ P_{3575} = (22, 14, 2, 1)$
$43:\ P_{3588} = (3, 15, 2, 1)$
$44:\ P_{3647} = (30, 16, 2, 1)$
$45:\ P_{3655} = (6, 17, 2, 1)$
$46:\ P_{3725} = (12, 19, 2, 1)$
$47:\ P_{3759} = (14, 20, 2, 1)$
$48:\ P_{3783} = (6, 21, 2, 1)$
$49:\ P_{3835} = (26, 22, 2, 1)$
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859 : $P_{32414} = (29, 19, 30, 1)$
860 : $P_{32465} = (16, 21, 30, 1)$
861 : $P_{32512} = (31, 22, 30, 1)$
862 : $P_{32538} = (25, 23, 30, 1)$
863 : $P_{32573} = (28, 24, 30, 1)$
864 : $P_{32581} = (4, 25, 30, 1)$
865 : $P_{32631} = (22, 26, 30, 1)$
866 : $P_{32642} = (1, 27, 30, 1)$
867 : $P_{32702} = (29, 28, 30, 1)$
868 : $P_{32729} = (24, 29, 30, 1)$
869 : $P_{32741} = (4, 30, 30, 1)$

870 : $P_{32794} = (25, 31, 30, 1)$
871 : $P_{32884} = (19, 2, 31, 1)$
872 : $P_{32927} = (30, 3, 31, 1)$
873 : $P_{32938} = (9, 4, 31, 1)$
874 : $P_{32984} = (23, 5, 31, 1)$
875 : $P_{32997} = (4, 6, 31, 1)$
876 : $P_{33028} = (3, 7, 31, 1)$
877 : $P_{33066} = (9, 8, 31, 1)$
878 : $P_{33099} = (10, 9, 31, 1)$
879 : $P_{33128} = (7, 10, 31, 1)$
880 : $P_{33175} = (22, 11, 31, 1)$
881 : $P_{33200} = (15, 12, 31, 1)$
882 : $P_{33239} = (22, 13, 31, 1)$
883 : $P_{33256} = (7, 14, 31, 1)$
884 : $P_{33300} = (19, 15, 31, 1)$
885 : $P_{33337} = (24, 16, 31, 1)$
886 : $P_{33360} = (15, 17, 31, 1)$
887 : $P_{33403} = (26, 18, 31, 1)$
888 : $P_{33435} = (26, 19, 31, 1)$
889 : $P_{33442} = (1, 20, 31, 1)$
890 : $P_{33490} = (17, 21, 31, 1)$
891 : $P_{33528} = (23, 22, 31, 1)$
892 : $P_{33554} = (17, 23, 31, 1)$
893 : $P_{33573} = (4, 24, 31, 1)$
894 : $P_{33612} = (11, 25, 31, 1)$
895 : $P_{33644} = (11, 26, 31, 1)$
896 : $P_{33727} = (30, 28, 31, 1)$
897 : $P_{33732} = (3, 29, 31, 1)$
898 : $P_{33785} = (24, 30, 31, 1)$
899 : $P_{33803} = (10, 31, 31, 1)$

Line Intersection Graph

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

Neighbor sets in the line intersection graph:
Line 0 intersects

Line	ℓ_1	ℓ_2	ℓ_3	ℓ_4
in point	P_0	P_5	P_0	P_1

Line 1 intersects

Line	ℓ_0	ℓ_2	ℓ_3	ℓ_5	ℓ_6
in point	P_0	P_2	P_0	P_2	P_2

Line 2 intersects

Line	ℓ_0	ℓ_1	ℓ_5	ℓ_6
in point	P_5	P_2	P_2	P_2

Line 3 intersects

Line	ℓ_0	ℓ_1	ℓ_4	ℓ_6
in point	P_0	P_0	P_{2114}	P_4

Line 4 intersects

Line	ℓ_0	ℓ_3	ℓ_5
in point	P_1	P_{2114}	P_{2082}

Line 5 intersects

Line	ℓ_1	ℓ_2	ℓ_4	ℓ_6
in point	P_2	P_2	P_{2082}	P_2

Line 6 intersects

Line	ℓ_1	ℓ_2	ℓ_3	ℓ_5
in point	P_2	P_2	P_4	P_2

The surface has 1121 points:
Too many to print.