Rank-65612 over GF(64)

January 15, 2021

The equation

The equation of the surface is :

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

(1, 0, 0, 1, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0)
The point rank of the equation over GF(64) is 1091047494

General information

Number of lines	7
Number of points	4289
Number of singular points	2
Number of Eckardt points	0
Number of double points	3
Number of single points	441
Number of points off lines	3843
Number of Hesse planes	0
Number of axes	0
Type of points on lines	65^7
Type of lines on points	4^2, 2^3, 1^{441}, 0^{3843}

Singular Points

The surface has 2 singular points:

$0: \ P_1 = \mathbf{P}(0,1,0,0) = \mathbf{P}(0,1,0,0)$
$1: \ P_2 = \mathbf{P}(0,0,1,0) = \mathbf{P}(0,0,1,0)$

The 7 Lines

The lines and their Pluecker coordinates are:

$$\ell_0 = \left[\begin{array}{cccc} 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \end{array}\right]_{17043456} = \left[\begin{array}{cccc} 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \end{array}\right]_{17043456} = \mathbf{Pl}(0,0,0,0,0,1)_{270401}$$

$$\ell_1 = \begin{bmatrix} 1 & 0 & 0 & \epsilon^{9} \\ 0 & 1 & 0 & 0 \end{bmatrix}_{12516288} = \begin{bmatrix} 1 & 0 & 0 & 47 \\ 0 & 1 & 0 & 0 \end{bmatrix}_{12516288} = \mathbf{Pl}(10,0,0,1,0,0)_{139}$$

$$\ell_2 = \begin{bmatrix} 1 & 0 & 0 & \epsilon^{18} \\ 0 & 1 & 0 & 0 \end{bmatrix}_{2929344} = \begin{bmatrix} 1 & 0 & 0 & 11 \\ 0 & 1 & 0 & 0 \end{bmatrix}_{2929344} = \mathbf{Pl}(37,0,0,1,0,0)_{166}$$

$$\ell_3 = \begin{bmatrix} 1 & 0 & 0 & \epsilon^{36} \\ 0 & 1 & 0 & 0 \end{bmatrix}_{9586944} = \begin{bmatrix} 1 & 0 & 0 & 36 \\ 0 & 1 & 0 & 0 \end{bmatrix}_{9586944} = \mathbf{Pl}(46,0,0,1,0,0)_{175}$$

$$\ell_4 = \begin{bmatrix} 1 & 0 & 0 & \epsilon^{9} \\ 0 & 0 & 1 & 0 \end{bmatrix}_{12520384} = \begin{bmatrix} 1 & 0 & 0 & 47 \\ 0 & 0 & 1 & 0 \end{bmatrix}_{12520384} = \mathbf{Pl}(0,47,1,0,0,0)_{112}$$

$$\ell_5 = \begin{bmatrix} 1 & 0 & 0 & \epsilon^{18} \\ 0 & 0 & 1 & 0 \end{bmatrix}_{2933440} = \begin{bmatrix} 1 & 0 & 0 & 11 \\ 0 & 0 & 1 & 0 \end{bmatrix}_{2933440} = \mathbf{Pl}(0,11,1,0,0,0)_{76}$$

$$\ell_6 = \begin{bmatrix} 1 & 0 & 0 & \epsilon^{36} \\ 0 & 0 & 1 & 0 \end{bmatrix}_{9591040} = \begin{bmatrix} 1 & 0 & 0 & 36 \\ 0 & 0 & 1 & 0 \end{bmatrix}_{9591040} = \mathbf{Pl}(0,36,1,0,0,0)_{101}$$

Rank of lines: (17043456, 12516288, 2929344, 9586944, 12520384, 2933440, 9591040)
Rank of points on Klein quadric: (270401, 139, 166, 175, 112, 76, 101)

Eckardt Points

The surface has 0 Eckardt points:

Double Points

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

$P_{4172} = (10,0,0,1) = \ell_1 \cap \ell_4$
$P_{4199} = (37,0,0,1) = \ell_2 \cap \ell_5$
$P_{4208} = (46,0,0,1) = \ell_3 \cap \ell_6$

Single Points

The surface has 441 single points:
The single points on the surface are:

0 : $P_{131} = (0,1,1,0)$ lies on line ℓ_0
1 : $P_{195} = (0,2,1,0)$ lies on line ℓ_0
2 : $P_{259} = (0,3,1,0)$ lies on line ℓ_0
3 : $P_{323} = (0,4,1,0)$ lies on line ℓ_0
4 : $P_{387} = (0,5,1,0)$ lies on line ℓ_0
5 : $P_{451} = (0,6,1,0)$ lies on line ℓ_0
6 : $P_{515} = (0,7,1,0)$ lies on line ℓ_0
7 : $P_{579} = (0,8,1,0)$ lies on line ℓ_0
8 : $P_{643} = (0,9,1,0)$ lies on line ℓ_0
9 : $P_{707} = (0,10,1,0)$ lies on line ℓ_0
10 : $P_{771} = (0,11,1,0)$ lies on line ℓ_0
11 : $P_{835} = (0,12,1,0)$ lies on line ℓ_0
12 : $P_{899} = (0,13,1,0)$ lies on line ℓ_0
13 : $P_{963} = (0,14,1,0)$ lies on line ℓ_0
14 : $P_{1027} = (0,15,1,0)$ lies on line ℓ_0
15 : $P_{1091} = (0,16,1,0)$ lies on line ℓ_0
16 : $P_{1155} = (0,17,1,0)$ lies on line ℓ_0
17 : $P_{1219} = (0,18,1,0)$ lies on line ℓ_0
18 : $P_{1283} = (0,19,1,0)$ lies on line ℓ_0
19 : $P_{1347} = (0,20,1,0)$ lies on line ℓ_0
20 : $P_{1411} = (0,21,1,0)$ lies on line ℓ_0
21 : $P_{1475} = (0,22,1,0)$ lies on line ℓ_0
22 : $P_{1539} = (0,23,1,0)$ lies on line ℓ_0
23 : $P_{1603} = (0,24,1,0)$ lies on line ℓ_0
24 : $P_{1667} = (0,25,1,0)$ lies on line ℓ_0
25 : $P_{1731} = (0,26,1,0)$ lies on line ℓ_0
26 : $P_{1795} = (0,27,1,0)$ lies on line ℓ_0
27 : $P_{1859} = (0,28,1,0)$ lies on line ℓ_0
28 : $P_{1923} = (0,29,1,0)$ lies on line ℓ_0
29 : $P_{1987} = (0,30,1,0)$ lies on line ℓ_0

30 : $P_{2051} = (0, 31, 1, 0)$ lies on line ℓ_0
31 : $P_{2115} = (0, 32, 1, 0)$ lies on line ℓ_0
32 : $P_{2179} = (0, 33, 1, 0)$ lies on line ℓ_0
33 : $P_{2243} = (0, 34, 1, 0)$ lies on line ℓ_0
34 : $P_{2307} = (0, 35, 1, 0)$ lies on line ℓ_0
35 : $P_{2371} = (0, 36, 1, 0)$ lies on line ℓ_0
36 : $P_{2435} = (0, 37, 1, 0)$ lies on line ℓ_0
37 : $P_{2499} = (0, 38, 1, 0)$ lies on line ℓ_0
38 : $P_{2563} = (0, 39, 1, 0)$ lies on line ℓ_0
39 : $P_{2627} = (0, 40, 1, 0)$ lies on line ℓ_0
40 : $P_{2691} = (0, 41, 1, 0)$ lies on line ℓ_0
41 : $P_{2755} = (0, 42, 1, 0)$ lies on line ℓ_0
42 : $P_{2819} = (0, 43, 1, 0)$ lies on line ℓ_0
43 : $P_{2883} = (0, 44, 1, 0)$ lies on line ℓ_0
44 : $P_{2947} = (0, 45, 1, 0)$ lies on line ℓ_0
45 : $P_{3011} = (0, 46, 1, 0)$ lies on line ℓ_0
46 : $P_{3075} = (0, 47, 1, 0)$ lies on line ℓ_0
47 : $P_{3139} = (0, 48, 1, 0)$ lies on line ℓ_0
48 : $P_{3203} = (0, 49, 1, 0)$ lies on line ℓ_0
49 : $P_{3267} = (0, 50, 1, 0)$ lies on line ℓ_0
50 : $P_{3331} = (0, 51, 1, 0)$ lies on line ℓ_0
51 : $P_{3395} = (0, 52, 1, 0)$ lies on line ℓ_0
52 : $P_{3459} = (0, 53, 1, 0)$ lies on line ℓ_0
53 : $P_{3523} = (0, 54, 1, 0)$ lies on line ℓ_0
54 : $P_{3587} = (0, 55, 1, 0)$ lies on line ℓ_0
55 : $P_{3651} = (0, 56, 1, 0)$ lies on line ℓ_0
56 : $P_{3715} = (0, 57, 1, 0)$ lies on line ℓ_0
57 : $P_{3779} = (0, 58, 1, 0)$ lies on line ℓ_0
58 : $P_{3843} = (0, 59, 1, 0)$ lies on line ℓ_0
59 : $P_{3907} = (0, 60, 1, 0)$ lies on line ℓ_0
60 : $P_{3971} = (0, 61, 1, 0)$ lies on line ℓ_0
61 : $P_{4035} = (0, 62, 1, 0)$ lies on line ℓ_0
62 : $P_{4099} = (0, 63, 1, 0)$ lies on line ℓ_0
63 : $P_{4236} = (10, 1, 0, 1)$ lies on line ℓ_1
64 : $P_{4263} = (37, 1, 0, 1)$ lies on line ℓ_2
65 : $P_{4272} = (46, 1, 0, 1)$ lies on line ℓ_3
66 : $P_{4300} = (10, 2, 0, 1)$ lies on line ℓ_1
67 : $P_{4327} = (37, 2, 0, 1)$ lies on line ℓ_2
68 : $P_{4336} = (46, 2, 0, 1)$ lies on line ℓ_3
69 : $P_{4364} = (10, 3, 0, 1)$ lies on line ℓ_1
70 : $P_{4391} = (37, 3, 0, 1)$ lies on line ℓ_2
71 : $P_{4400} = (46, 3, 0, 1)$ lies on line ℓ_3
72 : $P_{4428} = (10, 4, 0, 1)$ lies on line ℓ_1
73 : $P_{4455} = (37, 4, 0, 1)$ lies on line ℓ_2
74 : $P_{4464} = (46, 4, 0, 1)$ lies on line ℓ_3
75 : $P_{4492} = (10, 5, 0, 1)$ lies on line ℓ_1
76 : $P_{4519} = (37, 5, 0, 1)$ lies on line ℓ_2
77 : $P_{4528} = (46, 5, 0, 1)$ lies on line ℓ_3
78 : $P_{4556} = (10, 6, 0, 1)$ lies on line ℓ_1
79 : $P_{4583} = (37, 6, 0, 1)$ lies on line ℓ_2
80 : $P_{4592} = (46, 6, 0, 1)$ lies on line ℓ_3
81 : $P_{4620} = (10, 7, 0, 1)$ lies on line ℓ_1
82 : $P_{4647} = (37, 7, 0, 1)$ lies on line ℓ_2
83 : $P_{4656} = (46, 7, 0, 1)$ lies on line ℓ_3
84 : $P_{4684} = (10, 8, 0, 1)$ lies on line ℓ_1
85 : $P_{4711} = (37, 8, 0, 1)$ lies on line ℓ_2
86 : $P_{4720} = (46, 8, 0, 1)$ lies on line ℓ_3
87 : $P_{4748} = (10, 9, 0, 1)$ lies on line ℓ_1
88 : $P_{4775} = (37, 9, 0, 1)$ lies on line ℓ_2
89 : $P_{4784} = (46, 9, 0, 1)$ lies on line ℓ_3
90 : $P_{4812} = (10, 10, 0, 1)$ lies on line ℓ_1
91 : $P_{4839} = (37, 10, 0, 1)$ lies on line ℓ_2
92 : $P_{4848} = (46, 10, 0, 1)$ lies on line ℓ_3
93 : $P_{4876} = (10, 11, 0, 1)$ lies on line ℓ_1
94 : $P_{4903} = (37, 11, 0, 1)$ lies on line ℓ_2
95 : $P_{4912} = (46, 11, 0, 1)$ lies on line ℓ_3
96 : $P_{4940} = (10, 12, 0, 1)$ lies on line ℓ_1
97 : $P_{4967} = (37, 12, 0, 1)$ lies on line ℓ_2
98 : $P_{4976} = (46, 12, 0, 1)$ lies on line ℓ_3
99 : $P_{5004} = (10, 13, 0, 1)$ lies on line ℓ_1
100 : $P_{5031} = (37, 13, 0, 1)$ lies on line ℓ_2
101 : $P_{5040} = (46, 13, 0, 1)$ lies on line ℓ_3
102 : $P_{5068} = (10, 14, 0, 1)$ lies on line ℓ_1
103 : $P_{5095} = (37, 14, 0, 1)$ lies on line ℓ_2
104 : $P_{5104} = (46, 14, 0, 1)$ lies on line ℓ_3
105 : $P_{5132} = (10, 15, 0, 1)$ lies on line ℓ_1
106 : $P_{5159} = (37, 15, 0, 1)$ lies on line ℓ_2
107 : $P_{5168} = (46, 15, 0, 1)$ lies on line ℓ_3
108 : $P_{5196} = (10, 16, 0, 1)$ lies on line ℓ_1
109 : $P_{5223} = (37, 16, 0, 1)$ lies on line ℓ_2
110 : $P_{5232} = (46, 16, 0, 1)$ lies on line ℓ_3
111 : $P_{5260} = (10, 17, 0, 1)$ lies on line ℓ_1
112 : $P_{5287} = (37, 17, 0, 1)$ lies on line ℓ_2
113 : $P_{5296} = (46, 17, 0, 1)$ lies on line ℓ_3
114 : $P_{5324} = (10, 18, 0, 1)$ lies on line ℓ_1
115 : $P_{5351} = (37, 18, 0, 1)$ lies on line ℓ_2
116 : $P_{5360} = (46, 18, 0, 1)$ lies on line ℓ_3
117 : $P_{5388} = (10, 19, 0, 1)$ lies on line ℓ_1
118 : $P_{5415} = (37, 19, 0, 1)$ lies on line ℓ_2
119 : $P_{5424} = (46, 19, 0, 1)$ lies on line ℓ_3
120 : $P_{5452} = (10, 20, 0, 1)$ lies on line ℓ_1
121 : $P_{5479} = (37, 20, 0, 1)$ lies on line ℓ_2
122 : $P_{5488} = (46, 20, 0, 1)$ lies on line ℓ_3
123 : $P_{5516} = (10, 21, 0, 1)$ lies on line ℓ_1
124 : $P_{5543} = (37, 21, 0, 1)$ lies on line ℓ_2
125 : $P_{5552} = (46, 21, 0, 1)$ lies on line ℓ_3
126 : $P_{5580} = (10, 22, 0, 1)$ lies on line ℓ_1
127 : $P_{5607} = (37, 22, 0, 1)$ lies on line ℓ_2
128 : $P_{5616} = (46, 22, 0, 1)$ lies on line ℓ_3
129 : $P_{5644} = (10, 23, 0, 1)$ lies on line ℓ_1
130 : $P_{5671} = (37, 23, 0, 1)$ lies on line ℓ_2
131 : $P_{5680} = (46, 23, 0, 1)$ lies on line ℓ_3
132 : $P_{5708} = (10, 24, 0, 1)$ lies on line ℓ_1
133 : $P_{5735} = (37, 24, 0, 1)$ lies on line ℓ_2
134 : $P_{5744} = (46, 24, 0, 1)$ lies on line ℓ_3
135 : $P_{5772} = (10, 25, 0, 1)$ lies on line ℓ_1
136 : $P_{5799} = (37, 25, 0, 1)$ lies on line ℓ_2
137 : $P_{5808} = (46, 25, 0, 1)$ lies on line ℓ_3

138 : $P_{5836} = (10, 26, 0, 1)$ lies on line ℓ_1
139 : $P_{5863} = (37, 26, 0, 1)$ lies on line ℓ_2
140 : $P_{5872} = (46, 26, 0, 1)$ lies on line ℓ_3
141 : $P_{5900} = (10, 27, 0, 1)$ lies on line ℓ_1
142 : $P_{5927} = (37, 27, 0, 1)$ lies on line ℓ_2
143 : $P_{5936} = (46, 27, 0, 1)$ lies on line ℓ_3
144 : $P_{5964} = (10, 28, 0, 1)$ lies on line ℓ_1
145 : $P_{5991} = (37, 28, 0, 1)$ lies on line ℓ_2
146 : $P_{6000} = (46, 28, 0, 1)$ lies on line ℓ_3
147 : $P_{6028} = (10, 29, 0, 1)$ lies on line ℓ_1
148 : $P_{6055} = (37, 29, 0, 1)$ lies on line ℓ_2
149 : $P_{6064} = (46, 29, 0, 1)$ lies on line ℓ_3
150 : $P_{6092} = (10, 30, 0, 1)$ lies on line ℓ_1
151 : $P_{6119} = (37, 30, 0, 1)$ lies on line ℓ_2
152 : $P_{6128} = (46, 30, 0, 1)$ lies on line ℓ_3
153 : $P_{6156} = (10, 31, 0, 1)$ lies on line ℓ_1
154 : $P_{6183} = (37, 31, 0, 1)$ lies on line ℓ_2
155 : $P_{6192} = (46, 31, 0, 1)$ lies on line ℓ_3
156 : $P_{6220} = (10, 32, 0, 1)$ lies on line ℓ_1
157 : $P_{6247} = (37, 32, 0, 1)$ lies on line ℓ_2
158 : $P_{6256} = (46, 32, 0, 1)$ lies on line ℓ_3
159 : $P_{6284} = (10, 33, 0, 1)$ lies on line ℓ_1
160 : $P_{6311} = (37, 33, 0, 1)$ lies on line ℓ_2
161 : $P_{6320} = (46, 33, 0, 1)$ lies on line ℓ_3
162 : $P_{6348} = (10, 34, 0, 1)$ lies on line ℓ_1
163 : $P_{6375} = (37, 34, 0, 1)$ lies on line ℓ_2
164 : $P_{6384} = (46, 34, 0, 1)$ lies on line ℓ_3
165 : $P_{6412} = (10, 35, 0, 1)$ lies on line ℓ_1
166 : $P_{6439} = (37, 35, 0, 1)$ lies on line ℓ_2
167 : $P_{6448} = (46, 35, 0, 1)$ lies on line ℓ_3
168 : $P_{6476} = (10, 36, 0, 1)$ lies on line ℓ_1
169 : $P_{6503} = (37, 36, 0, 1)$ lies on line ℓ_2
170 : $P_{6512} = (46, 36, 0, 1)$ lies on line ℓ_3
171 : $P_{6540} = (10, 37, 0, 1)$ lies on line ℓ_1
172 : $P_{6567} = (37, 37, 0, 1)$ lies on line ℓ_2
173 : $P_{6576} = (46, 37, 0, 1)$ lies on line ℓ_3
174 : $P_{6604} = (10, 38, 0, 1)$ lies on line ℓ_1
175 : $P_{6631} = (37, 38, 0, 1)$ lies on line ℓ_2
176 : $P_{6640} = (46, 38, 0, 1)$ lies on line ℓ_3
177 : $P_{6668} = (10, 39, 0, 1)$ lies on line ℓ_1
178 : $P_{6695} = (37, 39, 0, 1)$ lies on line ℓ_2
179 : $P_{6704} = (46, 39, 0, 1)$ lies on line ℓ_3
180 : $P_{6732} = (10, 40, 0, 1)$ lies on line ℓ_1
181 : $P_{6759} = (37, 40, 0, 1)$ lies on line ℓ_2
182 : $P_{6768} = (46, 40, 0, 1)$ lies on line ℓ_3
183 : $P_{6796} = (10, 41, 0, 1)$ lies on line ℓ_1
184 : $P_{6823} = (37, 41, 0, 1)$ lies on line ℓ_2
185 : $P_{6832} = (46, 41, 0, 1)$ lies on line ℓ_3
186 : $P_{6860} = (10, 42, 0, 1)$ lies on line ℓ_1
187 : $P_{6887} = (37, 42, 0, 1)$ lies on line ℓ_2
188 : $P_{6896} = (46, 42, 0, 1)$ lies on line ℓ_3
189 : $P_{6924} = (10, 43, 0, 1)$ lies on line ℓ_1
190 : $P_{6951} = (37, 43, 0, 1)$ lies on line ℓ_2
191 : $P_{6960} = (46, 43, 0, 1)$ lies on line ℓ_3
192 : $P_{6988} = (10, 44, 0, 1)$ lies on line ℓ_1
193 : $P_{7015} = (37, 44, 0, 1)$ lies on line ℓ_2
194 : $P_{7024} = (46, 44, 0, 1)$ lies on line ℓ_3
195 : $P_{7052} = (10, 45, 0, 1)$ lies on line ℓ_1
196 : $P_{7079} = (37, 45, 0, 1)$ lies on line ℓ_2
197 : $P_{7088} = (46, 45, 0, 1)$ lies on line ℓ_3
198 : $P_{7116} = (10, 46, 0, 1)$ lies on line ℓ_1
199 : $P_{7143} = (37, 46, 0, 1)$ lies on line ℓ_2
200 : $P_{7152} = (46, 46, 0, 1)$ lies on line ℓ_3
201 : $P_{7180} = (10, 47, 0, 1)$ lies on line ℓ_1
202 : $P_{7207} = (37, 47, 0, 1)$ lies on line ℓ_2
203 : $P_{7216} = (46, 47, 0, 1)$ lies on line ℓ_3
204 : $P_{7244} = (10, 48, 0, 1)$ lies on line ℓ_1
205 : $P_{7271} = (37, 48, 0, 1)$ lies on line ℓ_2
206 : $P_{7280} = (46, 48, 0, 1)$ lies on line ℓ_3
207 : $P_{7308} = (10, 49, 0, 1)$ lies on line ℓ_1
208 : $P_{7335} = (37, 49, 0, 1)$ lies on line ℓ_2
209 : $P_{7344} = (46, 49, 0, 1)$ lies on line ℓ_3
210 : $P_{7372} = (10, 50, 0, 1)$ lies on line ℓ_1
211 : $P_{7399} = (37, 50, 0, 1)$ lies on line ℓ_2
212 : $P_{7408} = (46, 50, 0, 1)$ lies on line ℓ_3
213 : $P_{7436} = (10, 51, 0, 1)$ lies on line ℓ_1
214 : $P_{7463} = (37, 51, 0, 1)$ lies on line ℓ_2
215 : $P_{7472} = (46, 51, 0, 1)$ lies on line ℓ_3
216 : $P_{7500} = (10, 52, 0, 1)$ lies on line ℓ_1
217 : $P_{7527} = (37, 52, 0, 1)$ lies on line ℓ_2
218 : $P_{7536} = (46, 52, 0, 1)$ lies on line ℓ_3
219 : $P_{7564} = (10, 53, 0, 1)$ lies on line ℓ_1
220 : $P_{7591} = (37, 53, 0, 1)$ lies on line ℓ_2
221 : $P_{7600} = (46, 53, 0, 1)$ lies on line ℓ_3
222 : $P_{7628} = (10, 54, 0, 1)$ lies on line ℓ_1
223 : $P_{7655} = (37, 54, 0, 1)$ lies on line ℓ_2
224 : $P_{7664} = (46, 54, 0, 1)$ lies on line ℓ_3
225 : $P_{7692} = (10, 55, 0, 1)$ lies on line ℓ_1
226 : $P_{7719} = (37, 55, 0, 1)$ lies on line ℓ_2
227 : $P_{7728} = (46, 55, 0, 1)$ lies on line ℓ_3
228 : $P_{7756} = (10, 56, 0, 1)$ lies on line ℓ_1
229 : $P_{7783} = (37, 56, 0, 1)$ lies on line ℓ_2
230 : $P_{7792} = (46, 56, 0, 1)$ lies on line ℓ_3
231 : $P_{7820} = (10, 57, 0, 1)$ lies on line ℓ_1
232 : $P_{7847} = (37, 57, 0, 1)$ lies on line ℓ_2
233 : $P_{7856} = (46, 57, 0, 1)$ lies on line ℓ_3
234 : $P_{7884} = (10, 58, 0, 1)$ lies on line ℓ_1
235 : $P_{7911} = (37, 58, 0, 1)$ lies on line ℓ_2
236 : $P_{7920} = (46, 58, 0, 1)$ lies on line ℓ_3
237 : $P_{7948} = (10, 59, 0, 1)$ lies on line ℓ_1
238 : $P_{7975} = (37, 59, 0, 1)$ lies on line ℓ_2
239 : $P_{7984} = (46, 59, 0, 1)$ lies on line ℓ_3
240 : $P_{8012} = (10, 60, 0, 1)$ lies on line ℓ_1
241 : $P_{8039} = (37, 60, 0, 1)$ lies on line ℓ_2
242 : $P_{8048} = (46, 60, 0, 1)$ lies on line ℓ_3
243 : $P_{8076} = (10, 61, 0, 1)$ lies on line ℓ_1
244 : $P_{8103} = (37, 61, 0, 1)$ lies on line ℓ_2
245 : $P_{8112} = (46, 61, 0, 1)$ lies on line ℓ_3

246 : $P_{8140} = (10, 62, 0, 1)$ lies on line ℓ_1
247 : $P_{8167} = (37, 62, 0, 1)$ lies on line ℓ_2
248 : $P_{8176} = (46, 62, 0, 1)$ lies on line ℓ_3
249 : $P_{8204} = (10, 63, 0, 1)$ lies on line ℓ_1
250 : $P_{8231} = (37, 63, 0, 1)$ lies on line ℓ_2
251 : $P_{8240} = (46, 63, 0, 1)$ lies on line ℓ_3
252 : $P_{8268} = (10, 0, 1, 1)$ lies on line ℓ_4
253 : $P_{8295} = (37, 0, 1, 1)$ lies on line ℓ_5
254 : $P_{8304} = (46, 0, 1, 1)$ lies on line ℓ_6
255 : $P_{12363} = (10, 0, 2, 1)$ lies on line ℓ_4
256 : $P_{12390} = (37, 0, 2, 1)$ lies on line ℓ_5
257 : $P_{12399} = (46, 0, 2, 1)$ lies on line ℓ_6
258 : $P_{16459} = (10, 0, 3, 1)$ lies on line ℓ_4
259 : $P_{16486} = (37, 0, 3, 1)$ lies on line ℓ_5
260 : $P_{16495} = (46, 0, 3, 1)$ lies on line ℓ_6
261 : $P_{20555} = (10, 0, 4, 1)$ lies on line ℓ_4
262 : $P_{20582} = (37, 0, 4, 1)$ lies on line ℓ_5
263 : $P_{20591} = (46, 0, 4, 1)$ lies on line ℓ_6
264 : $P_{24651} = (10, 0, 5, 1)$ lies on line ℓ_4
265 : $P_{24678} = (37, 0, 5, 1)$ lies on line ℓ_5
266 : $P_{24687} = (46, 0, 5, 1)$ lies on line ℓ_6
267 : $P_{28747} = (10, 0, 6, 1)$ lies on line ℓ_4
268 : $P_{28774} = (37, 0, 6, 1)$ lies on line ℓ_5
269 : $P_{28783} = (46, 0, 6, 1)$ lies on line ℓ_6
270 : $P_{32843} = (10, 0, 7, 1)$ lies on line ℓ_4
271 : $P_{32870} = (37, 0, 7, 1)$ lies on line ℓ_5
272 : $P_{32879} = (46, 0, 7, 1)$ lies on line ℓ_6
273 : $P_{36939} = (10, 0, 8, 1)$ lies on line ℓ_4
274 : $P_{36966} = (37, 0, 8, 1)$ lies on line ℓ_5
275 : $P_{36975} = (46, 0, 8, 1)$ lies on line ℓ_6
276 : $P_{41035} = (10, 0, 9, 1)$ lies on line ℓ_4
277 : $P_{41062} = (37, 0, 9, 1)$ lies on line ℓ_5
278 : $P_{41071} = (46, 0, 9, 1)$ lies on line ℓ_6
279 : $P_{45131} = (10, 0, 10, 1)$ lies on line ℓ_4
280 : $P_{45158} = (37, 0, 10, 1)$ lies on line ℓ_5
281 : $P_{45167} = (46, 0, 10, 1)$ lies on line ℓ_6
282 : $P_{49227} = (10, 0, 11, 1)$ lies on line ℓ_4
283 : $P_{49254} = (37, 0, 11, 1)$ lies on line ℓ_5
284 : $P_{49263} = (46, 0, 11, 1)$ lies on line ℓ_6
285 : $P_{53323} = (10, 0, 12, 1)$ lies on line ℓ_4
286 : $P_{53350} = (37, 0, 12, 1)$ lies on line ℓ_5
287 : $P_{53359} = (46, 0, 12, 1)$ lies on line ℓ_6
288 : $P_{57419} = (10, 0, 13, 1)$ lies on line ℓ_4
289 : $P_{57446} = (37, 0, 13, 1)$ lies on line ℓ_5
290 : $P_{57455} = (46, 0, 13, 1)$ lies on line ℓ_6
291 : $P_{61515} = (10, 0, 14, 1)$ lies on line ℓ_4
292 : $P_{61542} = (37, 0, 14, 1)$ lies on line ℓ_5
293 : $P_{61551} = (46, 0, 14, 1)$ lies on line ℓ_6
294 : $P_{65611} = (10, 0, 15, 1)$ lies on line ℓ_4
295 : $P_{65638} = (37, 0, 15, 1)$ lies on line ℓ_5
296 : $P_{65647} = (46, 0, 15, 1)$ lies on line ℓ_6
297 : $P_{69707} = (10, 0, 16, 1)$ lies on line ℓ_4
298 : $P_{69734} = (37, 0, 16, 1)$ lies on line ℓ_5
299 : $P_{69743} = (46, 0, 16, 1)$ lies on line ℓ_6
300 : $P_{73803} = (10, 0, 17, 1)$ lies on line ℓ_4
301 : $P_{73830} = (37, 0, 17, 1)$ lies on line ℓ_5
302 : $P_{73839} = (46, 0, 17, 1)$ lies on line ℓ_6
303 : $P_{77899} = (10, 0, 18, 1)$ lies on line ℓ_4
304 : $P_{77926} = (37, 0, 18, 1)$ lies on line ℓ_5
305 : $P_{77935} = (46, 0, 18, 1)$ lies on line ℓ_6
306 : $P_{81995} = (10, 0, 19, 1)$ lies on line ℓ_4
307 : $P_{82022} = (37, 0, 19, 1)$ lies on line ℓ_5
308 : $P_{82031} = (46, 0, 19, 1)$ lies on line ℓ_6
309 : $P_{86091} = (10, 0, 20, 1)$ lies on line ℓ_4
310 : $P_{86118} = (37, 0, 20, 1)$ lies on line ℓ_5
311 : $P_{86127} = (46, 0, 20, 1)$ lies on line ℓ_6
312 : $P_{90187} = (10, 0, 21, 1)$ lies on line ℓ_4
313 : $P_{90214} = (37, 0, 21, 1)$ lies on line ℓ_5
314 : $P_{90223} = (46, 0, 21, 1)$ lies on line ℓ_6
315 : $P_{94283} = (10, 0, 22, 1)$ lies on line ℓ_4
316 : $P_{94310} = (37, 0, 22, 1)$ lies on line ℓ_5
317 : $P_{94319} = (46, 0, 22, 1)$ lies on line ℓ_6
318 : $P_{98379} = (10, 0, 23, 1)$ lies on line ℓ_4
319 : $P_{98406} = (37, 0, 23, 1)$ lies on line ℓ_5
320 : $P_{98415} = (46, 0, 23, 1)$ lies on line ℓ_6
321 : $P_{102475} = (10, 0, 24, 1)$ lies on line ℓ_4
322 : $P_{102502} = (37, 0, 24, 1)$ lies on line ℓ_5
323 : $P_{102511} = (46, 0, 24, 1)$ lies on line ℓ_6
324 : $P_{106571} = (10, 0, 25, 1)$ lies on line ℓ_4
325 : $P_{106598} = (37, 0, 25, 1)$ lies on line ℓ_5
326 : $P_{106607} = (46, 0, 25, 1)$ lies on line ℓ_6
327 : $P_{110667} = (10, 0, 26, 1)$ lies on line ℓ_4
328 : $P_{110694} = (37, 0, 26, 1)$ lies on line ℓ_5
329 : $P_{110703} = (46, 0, 26, 1)$ lies on line ℓ_6
330 : $P_{114763} = (10, 0, 27, 1)$ lies on line ℓ_4
331 : $P_{114790} = (37, 0, 27, 1)$ lies on line ℓ_5
332 : $P_{114799} = (46, 0, 27, 1)$ lies on line ℓ_6
333 : $P_{118859} = (10, 0, 28, 1)$ lies on line ℓ_4
334 : $P_{118886} = (37, 0, 28, 1)$ lies on line ℓ_5
335 : $P_{118895} = (46, 0, 28, 1)$ lies on line ℓ_6
336 : $P_{122955} = (10, 0, 29, 1)$ lies on line ℓ_4
337 : $P_{122982} = (37, 0, 29, 1)$ lies on line ℓ_5
338 : $P_{122991} = (46, 0, 29, 1)$ lies on line ℓ_6
339 : $P_{127051} = (10, 0, 30, 1)$ lies on line ℓ_4
340 : $P_{127078} = (37, 0, 30, 1)$ lies on line ℓ_5
341 : $P_{127087} = (46, 0, 30, 1)$ lies on line ℓ_6
342 : $P_{131147} = (10, 0, 31, 1)$ lies on line ℓ_4
343 : $P_{131174} = (37, 0, 31, 1)$ lies on line ℓ_5
344 : $P_{131183} = (46, 0, 31, 1)$ lies on line ℓ_6
345 : $P_{135243} = (10, 0, 32, 1)$ lies on line ℓ_4
346 : $P_{135270} = (37, 0, 32, 1)$ lies on line ℓ_5
347 : $P_{135279} = (46, 0, 32, 1)$ lies on line ℓ_6
348 : $P_{139339} = (10, 0, 33, 1)$ lies on line ℓ_4
349 : $P_{139366} = (37, 0, 33, 1)$ lies on line ℓ_5
350 : $P_{139375} = (46, 0, 33, 1)$ lies on line ℓ_6
351 : $P_{143435} = (10, 0, 34, 1)$ lies on line ℓ_4
352 : $P_{143462} = (37, 0, 34, 1)$ lies on line ℓ_5
353 : $P_{143471} = (46, 0, 34, 1)$ lies on line ℓ_6

354 : $P_{147531} = (10, 0, 35, 1)$ lies on line ℓ_4
355 : $P_{147558} = (37, 0, 35, 1)$ lies on line ℓ_5
356 : $P_{147567} = (46, 0, 35, 1)$ lies on line ℓ_6
357 : $P_{151627} = (10, 0, 36, 1)$ lies on line ℓ_4
358 : $P_{151654} = (37, 0, 36, 1)$ lies on line ℓ_5
359 : $P_{151663} = (46, 0, 36, 1)$ lies on line ℓ_6
360 : $P_{155723} = (10, 0, 37, 1)$ lies on line ℓ_4
361 : $P_{155750} = (37, 0, 37, 1)$ lies on line ℓ_5
362 : $P_{155759} = (46, 0, 37, 1)$ lies on line ℓ_6
363 : $P_{159819} = (10, 0, 38, 1)$ lies on line ℓ_4
364 : $P_{159846} = (37, 0, 38, 1)$ lies on line ℓ_5
365 : $P_{159855} = (46, 0, 38, 1)$ lies on line ℓ_6
366 : $P_{163915} = (10, 0, 39, 1)$ lies on line ℓ_4
367 : $P_{163942} = (37, 0, 39, 1)$ lies on line ℓ_5
368 : $P_{163951} = (46, 0, 39, 1)$ lies on line ℓ_6
369 : $P_{168011} = (10, 0, 40, 1)$ lies on line ℓ_4
370 : $P_{168038} = (37, 0, 40, 1)$ lies on line ℓ_5
371 : $P_{168047} = (46, 0, 40, 1)$ lies on line ℓ_6
372 : $P_{172107} = (10, 0, 41, 1)$ lies on line ℓ_4
373 : $P_{172134} = (37, 0, 41, 1)$ lies on line ℓ_5
374 : $P_{172143} = (46, 0, 41, 1)$ lies on line ℓ_6
375 : $P_{176203} = (10, 0, 42, 1)$ lies on line ℓ_4
376 : $P_{176230} = (37, 0, 42, 1)$ lies on line ℓ_5
377 : $P_{176239} = (46, 0, 42, 1)$ lies on line ℓ_6
378 : $P_{180299} = (10, 0, 43, 1)$ lies on line ℓ_4
379 : $P_{180326} = (37, 0, 43, 1)$ lies on line ℓ_5
380 : $P_{180335} = (46, 0, 43, 1)$ lies on line ℓ_6
381 : $P_{184395} = (10, 0, 44, 1)$ lies on line ℓ_4
382 : $P_{184422} = (37, 0, 44, 1)$ lies on line ℓ_5
383 : $P_{184431} = (46, 0, 44, 1)$ lies on line ℓ_6
384 : $P_{188491} = (10, 0, 45, 1)$ lies on line ℓ_4
385 : $P_{188518} = (37, 0, 45, 1)$ lies on line ℓ_5
386 : $P_{188527} = (46, 0, 45, 1)$ lies on line ℓ_6
387 : $P_{192587} = (10, 0, 46, 1)$ lies on line ℓ_4
388 : $P_{192614} = (37, 0, 46, 1)$ lies on line ℓ_5
389 : $P_{192623} = (46, 0, 46, 1)$ lies on line ℓ_6
390 : $P_{196683} = (10, 0, 47, 1)$ lies on line ℓ_4
391 : $P_{196710} = (37, 0, 47, 1)$ lies on line ℓ_5
392 : $P_{196719} = (46, 0, 47, 1)$ lies on line ℓ_6
393 : $P_{200779} = (10, 0, 48, 1)$ lies on line ℓ_4
394 : $P_{200806} = (37, 0, 48, 1)$ lies on line ℓ_5
395 : $P_{200815} = (46, 0, 48, 1)$ lies on line ℓ_6
396 : $P_{204875} = (10, 0, 49, 1)$ lies on line ℓ_4
397 : $P_{204902} = (37, 0, 49, 1)$ lies on line ℓ_5
398 : $P_{204911} = (46, 0, 49, 1)$ lies on line ℓ_6
399 : $P_{208971} = (10, 0, 50, 1)$ lies on line ℓ_4
400 : $P_{208998} = (37, 0, 50, 1)$ lies on line ℓ_5
401 : $P_{209007} = (46, 0, 50, 1)$ lies on line ℓ_6
402 : $P_{213067} = (10, 0, 51, 1)$ lies on line ℓ_4
403 : $P_{213094} = (37, 0, 51, 1)$ lies on line ℓ_5
404 : $P_{213103} = (46, 0, 51, 1)$ lies on line ℓ_6
405 : $P_{217163} = (10, 0, 52, 1)$ lies on line ℓ_4
406 : $P_{217190} = (37, 0, 52, 1)$ lies on line ℓ_5
407 : $P_{217199} = (46, 0, 52, 1)$ lies on line ℓ_6
408 : $P_{221259} = (10, 0, 53, 1)$ lies on line ℓ_4
409 : $P_{221286} = (37, 0, 53, 1)$ lies on line ℓ_5
410 : $P_{221295} = (46, 0, 53, 1)$ lies on line ℓ_6
411 : $P_{225355} = (10, 0, 54, 1)$ lies on line ℓ_4
412 : $P_{225382} = (37, 0, 54, 1)$ lies on line ℓ_5
413 : $P_{225391} = (46, 0, 54, 1)$ lies on line ℓ_6
414 : $P_{229451} = (10, 0, 55, 1)$ lies on line ℓ_4
415 : $P_{229478} = (37, 0, 55, 1)$ lies on line ℓ_5
416 : $P_{229487} = (46, 0, 55, 1)$ lies on line ℓ_6
417 : $P_{233547} = (10, 0, 56, 1)$ lies on line ℓ_4
418 : $P_{233574} = (37, 0, 56, 1)$ lies on line ℓ_5
419 : $P_{233583} = (46, 0, 56, 1)$ lies on line ℓ_6
420 : $P_{237643} = (10, 0, 57, 1)$ lies on line ℓ_4
421 : $P_{237670} = (37, 0, 57, 1)$ lies on line ℓ_5
422 : $P_{237679} = (46, 0, 57, 1)$ lies on line ℓ_6
423 : $P_{241739} = (10, 0, 58, 1)$ lies on line ℓ_4
424 : $P_{241766} = (37, 0, 58, 1)$ lies on line ℓ_5
425 : $P_{241775} = (46, 0, 58, 1)$ lies on line ℓ_6
426 : $P_{245835} = (10, 0, 59, 1)$ lies on line ℓ_4
427 : $P_{245862} = (37, 0, 59, 1)$ lies on line ℓ_5
428 : $P_{245871} = (46, 0, 59, 1)$ lies on line ℓ_6
429 : $P_{249931} = (10, 0, 60, 1)$ lies on line ℓ_4
430 : $P_{249958} = (37, 0, 60, 1)$ lies on line ℓ_5
431 : $P_{249967} = (46, 0, 60, 1)$ lies on line ℓ_6
432 : $P_{254027} = (10, 0, 61, 1)$ lies on line ℓ_4
433 : $P_{254054} = (37, 0, 61, 1)$ lies on line ℓ_5
434 : $P_{254063} = (46, 0, 61, 1)$ lies on line ℓ_6
435 : $P_{258123} = (10, 0, 62, 1)$ lies on line ℓ_4
436 : $P_{258150} = (37, 0, 62, 1)$ lies on line ℓ_5
437 : $P_{258159} = (46, 0, 62, 1)$ lies on line ℓ_6
438 : $P_{262219} = (10, 0, 63, 1)$ lies on line ℓ_4
439 : $P_{262246} = (37, 0, 63, 1)$ lies on line ℓ_5
440 : $P_{262255} = (46, 0, 63, 1)$ lies on line ℓ_6

The single points on the surface are:

Points on surface but on no line

The surface has 3843 points not on any line:
Too many to print.

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_1	P_1	P_1	P_2	P_2	P_2

Line 1 intersects

Line	ℓ_0	ℓ_2	ℓ_3	ℓ_4
in point	P_1	P_1	P_1	P_{4172}

Line 2 intersects

Line	ℓ_0	ℓ_1	ℓ_3	ℓ_5
in point	P_1	P_1	P_1	P_{4199}

Line 3 intersects

Line	ℓ_0	ℓ_1	ℓ_2	ℓ_6
in point	P_1	P_1	P_1	P_{4208}

Line 4 intersects

Line	ℓ_0	ℓ_1	ℓ_5	ℓ_6
in point	P_2	P_{4172}	P_2	P_2

Line 5 intersects

Line	ℓ_0	ℓ_2	ℓ_4	ℓ_6
in point	P_2	P_{4199}	P_2	P_2

Line 6 intersects

Line	ℓ_0	ℓ_3	ℓ_4	ℓ_5
in point	P_2	P_{4208}	P_2	P_2

The surface has 4289 points:
Too many to print.