

Rank-65548 over GF(64)

January 15, 2021

The equation

The equation of the surface is :

$$X_0^3 + X_3^3 + X_0X_1X_2 = 0$$

(1, 0, 0, 1, 0, 0, 0, 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:

$$\ell_0 = \begin{bmatrix} 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \end{bmatrix}_{17043456} = \begin{bmatrix} 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \end{bmatrix}_{17043456} = \mathbf{Pl}(0, 0, 0, 0, 0, 1)_{270401}$$

$$\begin{aligned}
\ell_1 &= \begin{bmatrix} 1 & 0 & 0 & 1 \\ 0 & 1 & 0 & 0 \end{bmatrix}_{266304} = \begin{bmatrix} 1 & 0 & 0 & 1 \\ 0 & 1 & 0 & 0 \end{bmatrix}_{266304} = \mathbf{PI}(1, 0, 0, 1, 0, 0)_{130} \\
\ell_2 &= \begin{bmatrix} 1 & 0 & 0 & \epsilon^{21} \\ 0 & 1 & 0 & 0 \end{bmatrix}_{15179328} = \begin{bmatrix} 1 & 0 & 0 & 57 \\ 0 & 1 & 0 & 0 \end{bmatrix}_{15179328} = \mathbf{PI}(56, 0, 0, 1, 0, 0)_{185} \\
\ell_3 &= \begin{bmatrix} 1 & 0 & 0 & \epsilon^{42} \\ 0 & 1 & 0 & 0 \end{bmatrix}_{14913024} = \begin{bmatrix} 1 & 0 & 0 & 56 \\ 0 & 1 & 0 & 0 \end{bmatrix}_{14913024} = \mathbf{PI}(57, 0, 0, 1, 0, 0)_{186} \\
\ell_4 &= \begin{bmatrix} 1 & 0 & 0 & 1 \\ 0 & 0 & 1 & 0 \end{bmatrix}_{270400} = \begin{bmatrix} 1 & 0 & 0 & 1 \\ 0 & 0 & 1 & 0 \end{bmatrix}_{270400} = \mathbf{PI}(0, 1, 1, 0, 0, 0)_{66} \\
\ell_5 &= \begin{bmatrix} 1 & 0 & 0 & \epsilon^{21} \\ 0 & 0 & 1 & 0 \end{bmatrix}_{15183424} = \begin{bmatrix} 1 & 0 & 0 & 57 \\ 0 & 0 & 1 & 0 \end{bmatrix}_{15183424} = \mathbf{PI}(0, 57, 1, 0, 0, 0)_{122} \\
\ell_6 &= \begin{bmatrix} 1 & 0 & 0 & \epsilon^{42} \\ 0 & 0 & 1 & 0 \end{bmatrix}_{14917120} = \begin{bmatrix} 1 & 0 & 0 & 56 \\ 0 & 0 & 1 & 0 \end{bmatrix}_{14917120} = \mathbf{PI}(0, 56, 1, 0, 0, 0)_{121}
\end{aligned}$$

Rank of lines: (17043456, 266304, 15179328, 14913024, 270400, 15183424, 14917120)

Rank of points on Klein quadric: (270401, 130, 185, 186, 66, 122, 121)

Eckardt Points

The surface has 0 Eckardt points:

Double Points

The surface has 3 Double points:

The double points on the surface are:

$$\begin{aligned}
P_{4163} &= (1, 0, 0, 1) = \ell_1 \cap \ell_4 \\
P_{4218} &= (56, 0, 0, 1) = \ell_2 \cap \ell_5
\end{aligned}$$

$$P_{4219} = (57, 0, 0, 1) = \ell_3 \cap \ell_6$$

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 | 15 : $P_{1091} = (0, 16, 1, 0)$ lies on line ℓ_0 |
| 1 : $P_{195} = (0, 2, 1, 0)$ lies on line ℓ_0 | 16 : $P_{1155} = (0, 17, 1, 0)$ lies on line ℓ_0 |
| 2 : $P_{259} = (0, 3, 1, 0)$ lies on line ℓ_0 | 17 : $P_{1219} = (0, 18, 1, 0)$ lies on line ℓ_0 |
| 3 : $P_{323} = (0, 4, 1, 0)$ lies on line ℓ_0 | 18 : $P_{1283} = (0, 19, 1, 0)$ lies on line ℓ_0 |
| 4 : $P_{387} = (0, 5, 1, 0)$ lies on line ℓ_0 | 19 : $P_{1347} = (0, 20, 1, 0)$ lies on line ℓ_0 |
| 5 : $P_{451} = (0, 6, 1, 0)$ lies on line ℓ_0 | 20 : $P_{1411} = (0, 21, 1, 0)$ lies on line ℓ_0 |
| 6 : $P_{515} = (0, 7, 1, 0)$ lies on line ℓ_0 | 21 : $P_{1475} = (0, 22, 1, 0)$ lies on line ℓ_0 |
| 7 : $P_{579} = (0, 8, 1, 0)$ lies on line ℓ_0 | 22 : $P_{1539} = (0, 23, 1, 0)$ lies on line ℓ_0 |
| 8 : $P_{643} = (0, 9, 1, 0)$ lies on line ℓ_0 | 23 : $P_{1603} = (0, 24, 1, 0)$ lies on line ℓ_0 |
| 9 : $P_{707} = (0, 10, 1, 0)$ lies on line ℓ_0 | 24 : $P_{1667} = (0, 25, 1, 0)$ lies on line ℓ_0 |
| 10 : $P_{771} = (0, 11, 1, 0)$ lies on line ℓ_0 | 25 : $P_{1731} = (0, 26, 1, 0)$ lies on line ℓ_0 |
| 11 : $P_{835} = (0, 12, 1, 0)$ lies on line ℓ_0 | 26 : $P_{1795} = (0, 27, 1, 0)$ lies on line ℓ_0 |
| 12 : $P_{899} = (0, 13, 1, 0)$ lies on line ℓ_0 | 27 : $P_{1859} = (0, 28, 1, 0)$ lies on line ℓ_0 |
| 13 : $P_{963} = (0, 14, 1, 0)$ lies on line ℓ_0 | 28 : $P_{1923} = (0, 29, 1, 0)$ lies on line ℓ_0 |
| 14 : $P_{1027} = (0, 15, 1, 0)$ 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 : $P_{4227} = (1, 1, 0, 1)$ lies on line ℓ_1
 64 : $P_{4282} = (56, 1, 0, 1)$ lies on line ℓ_2
 65 : $P_{4283} = (57, 1, 0, 1)$ lies on line ℓ_3
 66 : $P_{4291} = (1, 2, 0, 1)$ lies on line ℓ_1
 67 : $P_{4346} = (56, 2, 0, 1)$ lies on line ℓ_2
 68 : $P_{4347} = (57, 2, 0, 1)$ lies on line ℓ_3
 69 : $P_{4355} = (1, 3, 0, 1)$ lies on line ℓ_1
 70 : $P_{4410} = (56, 3, 0, 1)$ lies on line ℓ_2
 71 : $P_{4411} = (57, 3, 0, 1)$ lies on line ℓ_3
 72 : $P_{4419} = (1, 4, 0, 1)$ lies on line ℓ_1
 73 : $P_{4474} = (56, 4, 0, 1)$ lies on line ℓ_2
 74 : $P_{4475} = (57, 4, 0, 1)$ lies on line ℓ_3
 75 : $P_{4483} = (1, 5, 0, 1)$ lies on line ℓ_1
 76 : $P_{4538} = (56, 5, 0, 1)$ lies on line ℓ_2
 77 : $P_{4539} = (57, 5, 0, 1)$ lies on line ℓ_3
 78 : $P_{4547} = (1, 6, 0, 1)$ lies on line ℓ_1
 79 : $P_{4602} = (56, 6, 0, 1)$ lies on line ℓ_2
 80 : $P_{4603} = (57, 6, 0, 1)$ lies on line ℓ_3
 81 : $P_{4611} = (1, 7, 0, 1)$ lies on line ℓ_1
 82 : $P_{4666} = (56, 7, 0, 1)$ lies on line ℓ_2
 83 : $P_{4667} = (57, 7, 0, 1)$ lies on line ℓ_3

84 : $P_{4675} = (1, 8, 0, 1)$ lies on line ℓ_1
 85 : $P_{4730} = (56, 8, 0, 1)$ lies on line ℓ_2
 86 : $P_{4731} = (57, 8, 0, 1)$ lies on line ℓ_3
 87 : $P_{4739} = (1, 9, 0, 1)$ lies on line ℓ_1
 88 : $P_{4794} = (56, 9, 0, 1)$ lies on line ℓ_2
 89 : $P_{4795} = (57, 9, 0, 1)$ lies on line ℓ_3
 90 : $P_{4803} = (1, 10, 0, 1)$ lies on line ℓ_1
 91 : $P_{4858} = (56, 10, 0, 1)$ lies on line ℓ_2
 92 : $P_{4859} = (57, 10, 0, 1)$ lies on line ℓ_3
 93 : $P_{4867} = (1, 11, 0, 1)$ lies on line ℓ_1
 94 : $P_{4922} = (56, 11, 0, 1)$ lies on line ℓ_2
 95 : $P_{4923} = (57, 11, 0, 1)$ lies on line ℓ_3
 96 : $P_{4931} = (1, 12, 0, 1)$ lies on line ℓ_1
 97 : $P_{4986} = (56, 12, 0, 1)$ lies on line ℓ_2
 98 : $P_{4987} = (57, 12, 0, 1)$ lies on line ℓ_3
 99 : $P_{4995} = (1, 13, 0, 1)$ lies on line ℓ_1
 100 : $P_{5050} = (56, 13, 0, 1)$ lies on line ℓ_2
 101 : $P_{5051} = (57, 13, 0, 1)$ lies on line ℓ_3
 102 : $P_{5059} = (1, 14, 0, 1)$ lies on line ℓ_1
 103 : $P_{5114} = (56, 14, 0, 1)$ lies on line ℓ_2
 104 : $P_{5115} = (57, 14, 0, 1)$ lies on line ℓ_3
 105 : $P_{5123} = (1, 15, 0, 1)$ lies on line ℓ_1
 106 : $P_{5178} = (56, 15, 0, 1)$ lies on line ℓ_2
 107 : $P_{5179} = (57, 15, 0, 1)$ lies on line ℓ_3
 108 : $P_{5187} = (1, 16, 0, 1)$ lies on line ℓ_1
 109 : $P_{5242} = (56, 16, 0, 1)$ lies on line ℓ_2
 110 : $P_{5243} = (57, 16, 0, 1)$ lies on line ℓ_3
 111 : $P_{5251} = (1, 17, 0, 1)$ lies on line ℓ_1
 112 : $P_{5306} = (56, 17, 0, 1)$ lies on line ℓ_2
 113 : $P_{5307} = (57, 17, 0, 1)$ lies on line ℓ_3
 114 : $P_{5315} = (1, 18, 0, 1)$ lies on line ℓ_1
 115 : $P_{5370} = (56, 18, 0, 1)$ lies on line ℓ_2
 116 : $P_{5371} = (57, 18, 0, 1)$ lies on line ℓ_3
 117 : $P_{5379} = (1, 19, 0, 1)$ lies on line ℓ_1
 118 : $P_{5434} = (56, 19, 0, 1)$ lies on line ℓ_2
 119 : $P_{5435} = (57, 19, 0, 1)$ lies on line ℓ_3
 120 : $P_{5443} = (1, 20, 0, 1)$ lies on line ℓ_1
 121 : $P_{5498} = (56, 20, 0, 1)$ lies on line ℓ_2
 122 : $P_{5499} = (57, 20, 0, 1)$ lies on line ℓ_3
 123 : $P_{5507} = (1, 21, 0, 1)$ lies on line ℓ_1
 124 : $P_{5562} = (56, 21, 0, 1)$ lies on line ℓ_2
 125 : $P_{5563} = (57, 21, 0, 1)$ lies on line ℓ_3
 126 : $P_{5571} = (1, 22, 0, 1)$ lies on line ℓ_1
 127 : $P_{5626} = (56, 22, 0, 1)$ lies on line ℓ_2
 128 : $P_{5627} = (57, 22, 0, 1)$ lies on line ℓ_3
 129 : $P_{5635} = (1, 23, 0, 1)$ lies on line ℓ_1
 130 : $P_{5690} = (56, 23, 0, 1)$ lies on line ℓ_2
 131 : $P_{5691} = (57, 23, 0, 1)$ lies on line ℓ_3
 132 : $P_{5699} = (1, 24, 0, 1)$ lies on line ℓ_1
 133 : $P_{5754} = (56, 24, 0, 1)$ lies on line ℓ_2
 134 : $P_{5755} = (57, 24, 0, 1)$ lies on line ℓ_3
 135 : $P_{5763} = (1, 25, 0, 1)$ lies on line ℓ_1
 136 : $P_{5818} = (56, 25, 0, 1)$ lies on line ℓ_2
 137 : $P_{5819} = (57, 25, 0, 1)$ lies on line ℓ_3

138 : $P_{5827} = (1, 26, 0, 1)$ lies on line ℓ_1
 139 : $P_{5882} = (56, 26, 0, 1)$ lies on line ℓ_2
 140 : $P_{5883} = (57, 26, 0, 1)$ lies on line ℓ_3
 141 : $P_{5891} = (1, 27, 0, 1)$ lies on line ℓ_1
 142 : $P_{5946} = (56, 27, 0, 1)$ lies on line ℓ_2
 143 : $P_{5947} = (57, 27, 0, 1)$ lies on line ℓ_3
 144 : $P_{5955} = (1, 28, 0, 1)$ lies on line ℓ_1
 145 : $P_{6010} = (56, 28, 0, 1)$ lies on line ℓ_2
 146 : $P_{6011} = (57, 28, 0, 1)$ lies on line ℓ_3
 147 : $P_{6019} = (1, 29, 0, 1)$ lies on line ℓ_1
 148 : $P_{6074} = (56, 29, 0, 1)$ lies on line ℓ_2
 149 : $P_{6075} = (57, 29, 0, 1)$ lies on line ℓ_3
 150 : $P_{6083} = (1, 30, 0, 1)$ lies on line ℓ_1
 151 : $P_{6138} = (56, 30, 0, 1)$ lies on line ℓ_2
 152 : $P_{6139} = (57, 30, 0, 1)$ lies on line ℓ_3
 153 : $P_{6147} = (1, 31, 0, 1)$ lies on line ℓ_1
 154 : $P_{6202} = (56, 31, 0, 1)$ lies on line ℓ_2
 155 : $P_{6203} = (57, 31, 0, 1)$ lies on line ℓ_3
 156 : $P_{6211} = (1, 32, 0, 1)$ lies on line ℓ_1
 157 : $P_{6266} = (56, 32, 0, 1)$ lies on line ℓ_2
 158 : $P_{6267} = (57, 32, 0, 1)$ lies on line ℓ_3
 159 : $P_{6275} = (1, 33, 0, 1)$ lies on line ℓ_1
 160 : $P_{6330} = (56, 33, 0, 1)$ lies on line ℓ_2
 161 : $P_{6331} = (57, 33, 0, 1)$ lies on line ℓ_3
 162 : $P_{6339} = (1, 34, 0, 1)$ lies on line ℓ_1
 163 : $P_{6394} = (56, 34, 0, 1)$ lies on line ℓ_2
 164 : $P_{6395} = (57, 34, 0, 1)$ lies on line ℓ_3
 165 : $P_{6403} = (1, 35, 0, 1)$ lies on line ℓ_1
 166 : $P_{6458} = (56, 35, 0, 1)$ lies on line ℓ_2
 167 : $P_{6459} = (57, 35, 0, 1)$ lies on line ℓ_3
 168 : $P_{6467} = (1, 36, 0, 1)$ lies on line ℓ_1
 169 : $P_{6522} = (56, 36, 0, 1)$ lies on line ℓ_2
 170 : $P_{6523} = (57, 36, 0, 1)$ lies on line ℓ_3
 171 : $P_{6531} = (1, 37, 0, 1)$ lies on line ℓ_1
 172 : $P_{6586} = (56, 37, 0, 1)$ lies on line ℓ_2
 173 : $P_{6587} = (57, 37, 0, 1)$ lies on line ℓ_3
 174 : $P_{6595} = (1, 38, 0, 1)$ lies on line ℓ_1
 175 : $P_{6650} = (56, 38, 0, 1)$ lies on line ℓ_2
 176 : $P_{6651} = (57, 38, 0, 1)$ lies on line ℓ_3
 177 : $P_{6659} = (1, 39, 0, 1)$ lies on line ℓ_1
 178 : $P_{6714} = (56, 39, 0, 1)$ lies on line ℓ_2
 179 : $P_{6715} = (57, 39, 0, 1)$ lies on line ℓ_3
 180 : $P_{6723} = (1, 40, 0, 1)$ lies on line ℓ_1
 181 : $P_{6778} = (56, 40, 0, 1)$ lies on line ℓ_2
 182 : $P_{6779} = (57, 40, 0, 1)$ lies on line ℓ_3
 183 : $P_{6787} = (1, 41, 0, 1)$ lies on line ℓ_1
 184 : $P_{6842} = (56, 41, 0, 1)$ lies on line ℓ_2
 185 : $P_{6843} = (57, 41, 0, 1)$ lies on line ℓ_3
 186 : $P_{6851} = (1, 42, 0, 1)$ lies on line ℓ_1
 187 : $P_{6906} = (56, 42, 0, 1)$ lies on line ℓ_2
 188 : $P_{6907} = (57, 42, 0, 1)$ lies on line ℓ_3
 189 : $P_{6915} = (1, 43, 0, 1)$ lies on line ℓ_1
 190 : $P_{6970} = (56, 43, 0, 1)$ lies on line ℓ_2
 191 : $P_{6971} = (57, 43, 0, 1)$ lies on line ℓ_3

192 : $P_{6979} = (1, 44, 0, 1)$ lies on line ℓ_1
 193 : $P_{7034} = (56, 44, 0, 1)$ lies on line ℓ_2
 194 : $P_{7035} = (57, 44, 0, 1)$ lies on line ℓ_3
 195 : $P_{7043} = (1, 45, 0, 1)$ lies on line ℓ_1
 196 : $P_{7098} = (56, 45, 0, 1)$ lies on line ℓ_2
 197 : $P_{7099} = (57, 45, 0, 1)$ lies on line ℓ_3
 198 : $P_{7107} = (1, 46, 0, 1)$ lies on line ℓ_1
 199 : $P_{7162} = (56, 46, 0, 1)$ lies on line ℓ_2
 200 : $P_{7163} = (57, 46, 0, 1)$ lies on line ℓ_3
 201 : $P_{7171} = (1, 47, 0, 1)$ lies on line ℓ_1
 202 : $P_{7226} = (56, 47, 0, 1)$ lies on line ℓ_2
 203 : $P_{7227} = (57, 47, 0, 1)$ lies on line ℓ_3
 204 : $P_{7235} = (1, 48, 0, 1)$ lies on line ℓ_1
 205 : $P_{7290} = (56, 48, 0, 1)$ lies on line ℓ_2
 206 : $P_{7291} = (57, 48, 0, 1)$ lies on line ℓ_3
 207 : $P_{7299} = (1, 49, 0, 1)$ lies on line ℓ_1
 208 : $P_{7354} = (56, 49, 0, 1)$ lies on line ℓ_2
 209 : $P_{7355} = (57, 49, 0, 1)$ lies on line ℓ_3
 210 : $P_{7363} = (1, 50, 0, 1)$ lies on line ℓ_1
 211 : $P_{7418} = (56, 50, 0, 1)$ lies on line ℓ_2
 212 : $P_{7419} = (57, 50, 0, 1)$ lies on line ℓ_3
 213 : $P_{7427} = (1, 51, 0, 1)$ lies on line ℓ_1
 214 : $P_{7482} = (56, 51, 0, 1)$ lies on line ℓ_2
 215 : $P_{7483} = (57, 51, 0, 1)$ lies on line ℓ_3
 216 : $P_{7491} = (1, 52, 0, 1)$ lies on line ℓ_1
 217 : $P_{7546} = (56, 52, 0, 1)$ lies on line ℓ_2
 218 : $P_{7547} = (57, 52, 0, 1)$ lies on line ℓ_3
 219 : $P_{7555} = (1, 53, 0, 1)$ lies on line ℓ_1
 220 : $P_{7610} = (56, 53, 0, 1)$ lies on line ℓ_2
 221 : $P_{7611} = (57, 53, 0, 1)$ lies on line ℓ_3
 222 : $P_{7619} = (1, 54, 0, 1)$ lies on line ℓ_1
 223 : $P_{7674} = (56, 54, 0, 1)$ lies on line ℓ_2
 224 : $P_{7675} = (57, 54, 0, 1)$ lies on line ℓ_3
 225 : $P_{7683} = (1, 55, 0, 1)$ lies on line ℓ_1
 226 : $P_{7738} = (56, 55, 0, 1)$ lies on line ℓ_2
 227 : $P_{7739} = (57, 55, 0, 1)$ lies on line ℓ_3
 228 : $P_{7747} = (1, 56, 0, 1)$ lies on line ℓ_1
 229 : $P_{7802} = (56, 56, 0, 1)$ lies on line ℓ_2
 230 : $P_{7803} = (57, 56, 0, 1)$ lies on line ℓ_3
 231 : $P_{7811} = (1, 57, 0, 1)$ lies on line ℓ_1
 232 : $P_{7866} = (56, 57, 0, 1)$ lies on line ℓ_2
 233 : $P_{7867} = (57, 57, 0, 1)$ lies on line ℓ_3
 234 : $P_{7875} = (1, 58, 0, 1)$ lies on line ℓ_1
 235 : $P_{7930} = (56, 58, 0, 1)$ lies on line ℓ_2
 236 : $P_{7931} = (57, 58, 0, 1)$ lies on line ℓ_3
 237 : $P_{7939} = (1, 59, 0, 1)$ lies on line ℓ_1
 238 : $P_{7994} = (56, 59, 0, 1)$ lies on line ℓ_2
 239 : $P_{7995} = (57, 59, 0, 1)$ lies on line ℓ_3
 240 : $P_{8003} = (1, 60, 0, 1)$ lies on line ℓ_1
 241 : $P_{8058} = (56, 60, 0, 1)$ lies on line ℓ_2
 242 : $P_{8059} = (57, 60, 0, 1)$ lies on line ℓ_3
 243 : $P_{8067} = (1, 61, 0, 1)$ lies on line ℓ_1
 244 : $P_{8122} = (56, 61, 0, 1)$ lies on line ℓ_2
 245 : $P_{8123} = (57, 61, 0, 1)$ lies on line ℓ_3

246 : $P_{8131} = (1, 62, 0, 1)$ lies on line ℓ_1
 247 : $P_{8186} = (56, 62, 0, 1)$ lies on line ℓ_2
 248 : $P_{8187} = (57, 62, 0, 1)$ lies on line ℓ_3
 249 : $P_{8195} = (1, 63, 0, 1)$ lies on line ℓ_1
 250 : $P_{8250} = (56, 63, 0, 1)$ lies on line ℓ_2
 251 : $P_{8251} = (57, 63, 0, 1)$ lies on line ℓ_3
 252 : $P_{8259} = (1, 0, 1, 1)$ lies on line ℓ_4
 253 : $P_{8314} = (56, 0, 1, 1)$ lies on line ℓ_5
 254 : $P_{8315} = (57, 0, 1, 1)$ lies on line ℓ_6
 255 : $P_{12354} = (1, 0, 2, 1)$ lies on line ℓ_4
 256 : $P_{12409} = (56, 0, 2, 1)$ lies on line ℓ_5
 257 : $P_{12410} = (57, 0, 2, 1)$ lies on line ℓ_6
 258 : $P_{16450} = (1, 0, 3, 1)$ lies on line ℓ_4
 259 : $P_{16505} = (56, 0, 3, 1)$ lies on line ℓ_5
 260 : $P_{16506} = (57, 0, 3, 1)$ lies on line ℓ_6
 261 : $P_{20546} = (1, 0, 4, 1)$ lies on line ℓ_4
 262 : $P_{20601} = (56, 0, 4, 1)$ lies on line ℓ_5
 263 : $P_{20602} = (57, 0, 4, 1)$ lies on line ℓ_6
 264 : $P_{24642} = (1, 0, 5, 1)$ lies on line ℓ_4
 265 : $P_{24697} = (56, 0, 5, 1)$ lies on line ℓ_5
 266 : $P_{24698} = (57, 0, 5, 1)$ lies on line ℓ_6
 267 : $P_{28738} = (1, 0, 6, 1)$ lies on line ℓ_4
 268 : $P_{28793} = (56, 0, 6, 1)$ lies on line ℓ_5
 269 : $P_{28794} = (57, 0, 6, 1)$ lies on line ℓ_6
 270 : $P_{32834} = (1, 0, 7, 1)$ lies on line ℓ_4
 271 : $P_{32889} = (56, 0, 7, 1)$ lies on line ℓ_5
 272 : $P_{32890} = (57, 0, 7, 1)$ lies on line ℓ_6
 273 : $P_{36930} = (1, 0, 8, 1)$ lies on line ℓ_4
 274 : $P_{36985} = (56, 0, 8, 1)$ lies on line ℓ_5
 275 : $P_{36986} = (57, 0, 8, 1)$ lies on line ℓ_6
 276 : $P_{41026} = (1, 0, 9, 1)$ lies on line ℓ_4
 277 : $P_{41081} = (56, 0, 9, 1)$ lies on line ℓ_5
 278 : $P_{41082} = (57, 0, 9, 1)$ lies on line ℓ_6
 279 : $P_{45122} = (1, 0, 10, 1)$ lies on line ℓ_4
 280 : $P_{45177} = (56, 0, 10, 1)$ lies on line ℓ_5
 281 : $P_{45178} = (57, 0, 10, 1)$ lies on line ℓ_6
 282 : $P_{49218} = (1, 0, 11, 1)$ lies on line ℓ_4
 283 : $P_{49273} = (56, 0, 11, 1)$ lies on line ℓ_5
 284 : $P_{49274} = (57, 0, 11, 1)$ lies on line ℓ_6
 285 : $P_{53314} = (1, 0, 12, 1)$ lies on line ℓ_4
 286 : $P_{53369} = (56, 0, 12, 1)$ lies on line ℓ_5
 287 : $P_{53370} = (57, 0, 12, 1)$ lies on line ℓ_6
 288 : $P_{57410} = (1, 0, 13, 1)$ lies on line ℓ_4
 289 : $P_{57465} = (56, 0, 13, 1)$ lies on line ℓ_5
 290 : $P_{57466} = (57, 0, 13, 1)$ lies on line ℓ_6
 291 : $P_{61506} = (1, 0, 14, 1)$ lies on line ℓ_4
 292 : $P_{61561} = (56, 0, 14, 1)$ lies on line ℓ_5
 293 : $P_{61562} = (57, 0, 14, 1)$ lies on line ℓ_6
 294 : $P_{65602} = (1, 0, 15, 1)$ lies on line ℓ_4
 295 : $P_{65657} = (56, 0, 15, 1)$ lies on line ℓ_5
 296 : $P_{65658} = (57, 0, 15, 1)$ lies on line ℓ_6
 297 : $P_{69698} = (1, 0, 16, 1)$ lies on line ℓ_4
 298 : $P_{69753} = (56, 0, 16, 1)$ lies on line ℓ_5
 299 : $P_{69754} = (57, 0, 16, 1)$ lies on line ℓ_6
 300 : $P_{73794} = (1, 0, 17, 1)$ lies on line ℓ_4
 301 : $P_{73849} = (56, 0, 17, 1)$ lies on line ℓ_5
 302 : $P_{73850} = (57, 0, 17, 1)$ lies on line ℓ_6
 303 : $P_{77890} = (1, 0, 18, 1)$ lies on line ℓ_4
 304 : $P_{77945} = (56, 0, 18, 1)$ lies on line ℓ_5
 305 : $P_{77946} = (57, 0, 18, 1)$ lies on line ℓ_6
 306 : $P_{81986} = (1, 0, 19, 1)$ lies on line ℓ_4
 307 : $P_{82041} = (56, 0, 19, 1)$ lies on line ℓ_5
 308 : $P_{82042} = (57, 0, 19, 1)$ lies on line ℓ_6
 309 : $P_{86082} = (1, 0, 20, 1)$ lies on line ℓ_4
 310 : $P_{86137} = (56, 0, 20, 1)$ lies on line ℓ_5
 311 : $P_{86138} = (57, 0, 20, 1)$ lies on line ℓ_6
 312 : $P_{90178} = (1, 0, 21, 1)$ lies on line ℓ_4
 313 : $P_{90233} = (56, 0, 21, 1)$ lies on line ℓ_5
 314 : $P_{90234} = (57, 0, 21, 1)$ lies on line ℓ_6
 315 : $P_{94274} = (1, 0, 22, 1)$ lies on line ℓ_4
 316 : $P_{94329} = (56, 0, 22, 1)$ lies on line ℓ_5
 317 : $P_{94330} = (57, 0, 22, 1)$ lies on line ℓ_6
 318 : $P_{98370} = (1, 0, 23, 1)$ lies on line ℓ_4
 319 : $P_{98425} = (56, 0, 23, 1)$ lies on line ℓ_5
 320 : $P_{98426} = (57, 0, 23, 1)$ lies on line ℓ_6
 321 : $P_{102466} = (1, 0, 24, 1)$ lies on line ℓ_4
 322 : $P_{102521} = (56, 0, 24, 1)$ lies on line ℓ_5
 323 : $P_{102522} = (57, 0, 24, 1)$ lies on line ℓ_6
 324 : $P_{106562} = (1, 0, 25, 1)$ lies on line ℓ_4
 325 : $P_{106617} = (56, 0, 25, 1)$ lies on line ℓ_5
 326 : $P_{106618} = (57, 0, 25, 1)$ lies on line ℓ_6
 327 : $P_{110658} = (1, 0, 26, 1)$ lies on line ℓ_4
 328 : $P_{110713} = (56, 0, 26, 1)$ lies on line ℓ_5
 329 : $P_{110714} = (57, 0, 26, 1)$ lies on line ℓ_6
 330 : $P_{114754} = (1, 0, 27, 1)$ lies on line ℓ_4
 331 : $P_{114809} = (56, 0, 27, 1)$ lies on line ℓ_5
 332 : $P_{114810} = (57, 0, 27, 1)$ lies on line ℓ_6
 333 : $P_{118850} = (1, 0, 28, 1)$ lies on line ℓ_4
 334 : $P_{118905} = (56, 0, 28, 1)$ lies on line ℓ_5
 335 : $P_{118906} = (57, 0, 28, 1)$ lies on line ℓ_6
 336 : $P_{122946} = (1, 0, 29, 1)$ lies on line ℓ_4
 337 : $P_{123001} = (56, 0, 29, 1)$ lies on line ℓ_5
 338 : $P_{123002} = (57, 0, 29, 1)$ lies on line ℓ_6
 339 : $P_{127042} = (1, 0, 30, 1)$ lies on line ℓ_4
 340 : $P_{127097} = (56, 0, 30, 1)$ lies on line ℓ_5
 341 : $P_{127098} = (57, 0, 30, 1)$ lies on line ℓ_6
 342 : $P_{131138} = (1, 0, 31, 1)$ lies on line ℓ_4
 343 : $P_{131193} = (56, 0, 31, 1)$ lies on line ℓ_5
 344 : $P_{131194} = (57, 0, 31, 1)$ lies on line ℓ_6
 345 : $P_{135234} = (1, 0, 32, 1)$ lies on line ℓ_4
 346 : $P_{135289} = (56, 0, 32, 1)$ lies on line ℓ_5
 347 : $P_{135290} = (57, 0, 32, 1)$ lies on line ℓ_6
 348 : $P_{139330} = (1, 0, 33, 1)$ lies on line ℓ_4
 349 : $P_{139385} = (56, 0, 33, 1)$ lies on line ℓ_5
 350 : $P_{139386} = (57, 0, 33, 1)$ lies on line ℓ_6
 351 : $P_{143426} = (1, 0, 34, 1)$ lies on line ℓ_4
 352 : $P_{143481} = (56, 0, 34, 1)$ lies on line ℓ_5
 353 : $P_{143482} = (57, 0, 34, 1)$ lies on line ℓ_6

354 : $P_{147522} = (1, 0, 35, 1)$ lies on line ℓ_4
 355 : $P_{147577} = (56, 0, 35, 1)$ lies on line ℓ_5
 356 : $P_{147578} = (57, 0, 35, 1)$ lies on line ℓ_6
 357 : $P_{151618} = (1, 0, 36, 1)$ lies on line ℓ_4
 358 : $P_{151673} = (56, 0, 36, 1)$ lies on line ℓ_5
 359 : $P_{151674} = (57, 0, 36, 1)$ lies on line ℓ_6
 360 : $P_{155714} = (1, 0, 37, 1)$ lies on line ℓ_4
 361 : $P_{155769} = (56, 0, 37, 1)$ lies on line ℓ_5
 362 : $P_{155770} = (57, 0, 37, 1)$ lies on line ℓ_6
 363 : $P_{159810} = (1, 0, 38, 1)$ lies on line ℓ_4
 364 : $P_{159865} = (56, 0, 38, 1)$ lies on line ℓ_5
 365 : $P_{159866} = (57, 0, 38, 1)$ lies on line ℓ_6
 366 : $P_{163906} = (1, 0, 39, 1)$ lies on line ℓ_4
 367 : $P_{163961} = (56, 0, 39, 1)$ lies on line ℓ_5
 368 : $P_{163962} = (57, 0, 39, 1)$ lies on line ℓ_6
 369 : $P_{168002} = (1, 0, 40, 1)$ lies on line ℓ_4
 370 : $P_{168057} = (56, 0, 40, 1)$ lies on line ℓ_5
 371 : $P_{168058} = (57, 0, 40, 1)$ lies on line ℓ_6
 372 : $P_{172098} = (1, 0, 41, 1)$ lies on line ℓ_4
 373 : $P_{172153} = (56, 0, 41, 1)$ lies on line ℓ_5
 374 : $P_{172154} = (57, 0, 41, 1)$ lies on line ℓ_6
 375 : $P_{176194} = (1, 0, 42, 1)$ lies on line ℓ_4
 376 : $P_{176249} = (56, 0, 42, 1)$ lies on line ℓ_5
 377 : $P_{176250} = (57, 0, 42, 1)$ lies on line ℓ_6
 378 : $P_{180290} = (1, 0, 43, 1)$ lies on line ℓ_4
 379 : $P_{180345} = (56, 0, 43, 1)$ lies on line ℓ_5
 380 : $P_{180346} = (57, 0, 43, 1)$ lies on line ℓ_6
 381 : $P_{184386} = (1, 0, 44, 1)$ lies on line ℓ_4
 382 : $P_{184441} = (56, 0, 44, 1)$ lies on line ℓ_5
 383 : $P_{184442} = (57, 0, 44, 1)$ lies on line ℓ_6
 384 : $P_{188482} = (1, 0, 45, 1)$ lies on line ℓ_4
 385 : $P_{188537} = (56, 0, 45, 1)$ lies on line ℓ_5
 386 : $P_{188538} = (57, 0, 45, 1)$ lies on line ℓ_6
 387 : $P_{192578} = (1, 0, 46, 1)$ lies on line ℓ_4
 388 : $P_{192633} = (56, 0, 46, 1)$ lies on line ℓ_5
 389 : $P_{192634} = (57, 0, 46, 1)$ lies on line ℓ_6
 390 : $P_{196674} = (1, 0, 47, 1)$ lies on line ℓ_4
 391 : $P_{196729} = (56, 0, 47, 1)$ lies on line ℓ_5
 392 : $P_{196730} = (57, 0, 47, 1)$ lies on line ℓ_6
 393 : $P_{200770} = (1, 0, 48, 1)$ lies on line ℓ_4
 394 : $P_{200825} = (56, 0, 48, 1)$ lies on line ℓ_5
 395 : $P_{200826} = (57, 0, 48, 1)$ lies on line ℓ_6
 396 : $P_{204866} = (1, 0, 49, 1)$ lies on line ℓ_4
 397 : $P_{204921} = (56, 0, 49, 1)$ lies on line ℓ_5
 398 : $P_{204922} = (57, 0, 49, 1)$ lies on line ℓ_6
 399 : $P_{208962} = (1, 0, 50, 1)$ lies on line ℓ_4
 400 : $P_{209017} = (56, 0, 50, 1)$ lies on line ℓ_5
 401 : $P_{209018} = (57, 0, 50, 1)$ lies on line ℓ_6
 402 : $P_{213058} = (1, 0, 51, 1)$ lies on line ℓ_4
 403 : $P_{213113} = (56, 0, 51, 1)$ lies on line ℓ_5
 404 : $P_{213114} = (57, 0, 51, 1)$ lies on line ℓ_6
 405 : $P_{217154} = (1, 0, 52, 1)$ lies on line ℓ_4
 406 : $P_{217209} = (56, 0, 52, 1)$ lies on line ℓ_5
 407 : $P_{217210} = (57, 0, 52, 1)$ lies on line ℓ_6
 408 : $P_{221250} = (1, 0, 53, 1)$ lies on line ℓ_4
 409 : $P_{221305} = (56, 0, 53, 1)$ lies on line ℓ_5
 410 : $P_{221306} = (57, 0, 53, 1)$ lies on line ℓ_6
 411 : $P_{225346} = (1, 0, 54, 1)$ lies on line ℓ_4
 412 : $P_{225401} = (56, 0, 54, 1)$ lies on line ℓ_5
 413 : $P_{225402} = (57, 0, 54, 1)$ lies on line ℓ_6
 414 : $P_{229442} = (1, 0, 55, 1)$ lies on line ℓ_4
 415 : $P_{229497} = (56, 0, 55, 1)$ lies on line ℓ_5
 416 : $P_{229498} = (57, 0, 55, 1)$ lies on line ℓ_6
 417 : $P_{233538} = (1, 0, 56, 1)$ lies on line ℓ_4
 418 : $P_{233593} = (56, 0, 56, 1)$ lies on line ℓ_5
 419 : $P_{233594} = (57, 0, 56, 1)$ lies on line ℓ_6
 420 : $P_{237634} = (1, 0, 57, 1)$ lies on line ℓ_4
 421 : $P_{237689} = (56, 0, 57, 1)$ lies on line ℓ_5
 422 : $P_{237690} = (57, 0, 57, 1)$ lies on line ℓ_6
 423 : $P_{241730} = (1, 0, 58, 1)$ lies on line ℓ_4
 424 : $P_{241785} = (56, 0, 58, 1)$ lies on line ℓ_5
 425 : $P_{241786} = (57, 0, 58, 1)$ lies on line ℓ_6
 426 : $P_{245826} = (1, 0, 59, 1)$ lies on line ℓ_4
 427 : $P_{245881} = (56, 0, 59, 1)$ lies on line ℓ_5
 428 : $P_{245882} = (57, 0, 59, 1)$ lies on line ℓ_6
 429 : $P_{249922} = (1, 0, 60, 1)$ lies on line ℓ_4
 430 : $P_{249977} = (56, 0, 60, 1)$ lies on line ℓ_5
 431 : $P_{249978} = (57, 0, 60, 1)$ lies on line ℓ_6
 432 : $P_{254018} = (1, 0, 61, 1)$ lies on line ℓ_4
 433 : $P_{254073} = (56, 0, 61, 1)$ lies on line ℓ_5
 434 : $P_{254074} = (57, 0, 61, 1)$ lies on line ℓ_6
 435 : $P_{258114} = (1, 0, 62, 1)$ lies on line ℓ_4
 436 : $P_{258169} = (56, 0, 62, 1)$ lies on line ℓ_5
 437 : $P_{258170} = (57, 0, 62, 1)$ lies on line ℓ_6
 438 : $P_{262210} = (1, 0, 63, 1)$ lies on line ℓ_4
 439 : $P_{262265} = (56, 0, 63, 1)$ lies on line ℓ_5
 440 : $P_{262266} = (57, 0, 63, 1)$ 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_{4163}

Line 2 intersects

Line	ℓ_0	ℓ_1	ℓ_3	ℓ_5
in point	P_1	P_1	P_1	P_{4218}

Line 3 intersects

Line	ℓ_0	ℓ_1	ℓ_2	ℓ_6
in point	P_1	P_1	P_1	P_{4219}

Line 4 intersects

Line	ℓ_0	ℓ_1	ℓ_5	ℓ_6
in point	P_2	P_{4163}	P_2	P_2

Line 5 intersects

Line	ℓ_0	ℓ_2	ℓ_4	ℓ_6
in point	P_2	P_{4218}	P_2	P_2

Line 6 intersects

Line	ℓ_0	ℓ_3	ℓ_4	ℓ_5
in point	P_2	P_{4219}	P_2	P_2

The surface has 4289 points:

Too many to print.