

# Rank-65843 over GF(64)

January 15, 2021

## The equation

The equation of the surface is :

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

( 0, 0, 0, 0, 1, 1, 0, 0, 1, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0 )  
The point rank of the equation over GF(64) is -2113662907

## General information

|                            |                |
|----------------------------|----------------|
| Number of lines            | 64             |
| Number of points           | 4097           |
| Number of singular points  | 65             |
| Number of Eckardt points   | 0              |
| Number of double points    | 0              |
| Number of single points    | 4096           |
| Number of points off lines | 0              |
| Number of Hesse planes     | 0              |
| Number of axes             | 0              |
| Type of points on lines    | $65^{64}$      |
| Type of lines on points    | $64, 1^{4096}$ |

## Singular Points

The surface has 65 singular points:

|                                                                               |                                                                                 |
|-------------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| 0 : $P_2 = \mathbf{P}(0, 0, 1, 0) = \mathbf{P}(0, 0, 1, 0)$                   | 8 : $P_{32833} = \mathbf{P}(0, 0, \epsilon^{39}, 1) = \mathbf{P}(0, 0, 7, 1)$   |
| 1 : $P_3 = \mathbf{P}(0, 0, 0, 1) = \mathbf{P}(0, 0, 0, 1)$                   | 9 : $P_{36929} = \mathbf{P}(0, 0, \epsilon^3, 1) = \mathbf{P}(0, 0, 8, 1)$      |
| 2 : $P_{8258} = \mathbf{P}(0, 0, 1, 1) = \mathbf{P}(0, 0, 1, 1)$              | 10 : $P_{41025} = \mathbf{P}(0, 0, \epsilon^{34}, 1) = \mathbf{P}(0, 0, 9, 1)$  |
| 3 : $P_{12353} = \mathbf{P}(0, 0, \epsilon, 1) = \mathbf{P}(0, 0, 2, 1)$      | 11 : $P_{45121} = \mathbf{P}(0, 0, \epsilon^{54}, 1) = \mathbf{P}(0, 0, 10, 1)$ |
| 4 : $P_{16449} = \mathbf{P}(0, 0, \epsilon^{58}, 1) = \mathbf{P}(0, 0, 3, 1)$ | 12 : $P_{49217} = \mathbf{P}(0, 0, \epsilon^{18}, 1) = \mathbf{P}(0, 0, 11, 1)$ |
| 5 : $P_{20545} = \mathbf{P}(0, 0, \epsilon^2, 1) = \mathbf{P}(0, 0, 4, 1)$    | 13 : $P_{53313} = \mathbf{P}(0, 0, \epsilon^{60}, 1) = \mathbf{P}(0, 0, 12, 1)$ |
| 6 : $P_{24641} = \mathbf{P}(0, 0, \epsilon^{53}, 1) = \mathbf{P}(0, 0, 5, 1)$ | 14 : $P_{57409} = \mathbf{P}(0, 0, \epsilon^{31}, 1) = \mathbf{P}(0, 0, 13, 1)$ |
| 7 : $P_{28737} = \mathbf{P}(0, 0, \epsilon^{59}, 1) = \mathbf{P}(0, 0, 6, 1)$ | 15 : $P_{61505} = \mathbf{P}(0, 0, \epsilon^{40}, 1) = \mathbf{P}(0, 0, 14, 1)$ |

$$\begin{aligned}
16 : P_{65601} &= \mathbf{P}(0, 0, \epsilon^{48}, 1) = \mathbf{P}(0, 0, 15, 1) & 41 : P_{168001} &= \mathbf{P}(0, 0, \epsilon^{56}, 1) = \mathbf{P}(0, 0, 40, 1) \\
17 : P_{69697} &= \mathbf{P}(0, 0, \epsilon^4, 1) = \mathbf{P}(0, 0, 16, 1) & 42 : P_{172097} &= \mathbf{P}(0, 0, \epsilon^{37}, 1) = \mathbf{P}(0, 0, 41, 1) \\
18 : P_{73793} &= \mathbf{P}(0, 0, \epsilon^{43}, 1) = \mathbf{P}(0, 0, 17, 1) & 43 : P_{176193} &= \mathbf{P}(0, 0, \epsilon^{16}, 1) = \mathbf{P}(0, 0, 42, 1) \\
19 : P_{77889} &= \mathbf{P}(0, 0, \epsilon^{35}, 1) = \mathbf{P}(0, 0, 18, 1) & 44 : P_{180289} &= \mathbf{P}(0, 0, \epsilon^{46}, 1) = \mathbf{P}(0, 0, 43, 1) \\
20 : P_{81985} &= \mathbf{P}(0, 0, \epsilon^{22}, 1) = \mathbf{P}(0, 0, 19, 1) & 45 : P_{184385} &= \mathbf{P}(0, 0, \epsilon^{20}, 1) = \mathbf{P}(0, 0, 44, 1) \\
21 : P_{86081} &= \mathbf{P}(0, 0, \epsilon^{55}, 1) = \mathbf{P}(0, 0, 20, 1) & 46 : P_{188481} &= \mathbf{P}(0, 0, \epsilon^{24}, 1) = \mathbf{P}(0, 0, 45, 1) \\
22 : P_{90177} &= \mathbf{P}(0, 0, \epsilon^{15}, 1) = \mathbf{P}(0, 0, 21, 1) & 47 : P_{192577} &= \mathbf{P}(0, 0, \epsilon^{27}, 1) = \mathbf{P}(0, 0, 46, 1) \\
23 : P_{94273} &= \mathbf{P}(0, 0, \epsilon^{19}, 1) = \mathbf{P}(0, 0, 22, 1) & 48 : P_{196673} &= \mathbf{P}(0, 0, \epsilon^9, 1) = \mathbf{P}(0, 0, 47, 1) \\
24 : P_{98369} &= \mathbf{P}(0, 0, \epsilon^{26}, 1) = \mathbf{P}(0, 0, 23, 1) & 49 : P_{200769} &= \mathbf{P}(0, 0, \epsilon^{62}, 1) = \mathbf{P}(0, 0, 48, 1) \\
25 : P_{102465} &= \mathbf{P}(0, 0, \epsilon^{61}, 1) = \mathbf{P}(0, 0, 24, 1) & 50 : P_{204865} &= \mathbf{P}(0, 0, \epsilon^{57}, 1) = \mathbf{P}(0, 0, 49, 1) \\
26 : P_{106561} &= \mathbf{P}(0, 0, \epsilon^{51}, 1) = \mathbf{P}(0, 0, 25, 1) & 51 : P_{208961} &= \mathbf{P}(0, 0, \epsilon^{52}, 1) = \mathbf{P}(0, 0, 50, 1) \\
27 : P_{110657} &= \mathbf{P}(0, 0, \epsilon^{32}, 1) = \mathbf{P}(0, 0, 26, 1) & 52 : P_{213057} &= \mathbf{P}(0, 0, \epsilon^{38}, 1) = \mathbf{P}(0, 0, 51, 1) \\
28 : P_{114753} &= \mathbf{P}(0, 0, \epsilon^{29}, 1) = \mathbf{P}(0, 0, 27, 1) & 53 : P_{217153} &= \mathbf{P}(0, 0, \epsilon^{33}, 1) = \mathbf{P}(0, 0, 52, 1) \\
29 : P_{118849} &= \mathbf{P}(0, 0, \epsilon^{41}, 1) = \mathbf{P}(0, 0, 28, 1) & 54 : P_{221249} &= \mathbf{P}(0, 0, \epsilon^{17}, 1) = \mathbf{P}(0, 0, 53, 1) \\
30 : P_{122945} &= \mathbf{P}(0, 0, \epsilon^{13}, 1) = \mathbf{P}(0, 0, 29, 1) & 55 : P_{225345} &= \mathbf{P}(0, 0, \epsilon^{30}, 1) = \mathbf{P}(0, 0, 54, 1) \\
31 : P_{127041} &= \mathbf{P}(0, 0, \epsilon^{49}, 1) = \mathbf{P}(0, 0, 30, 1) & 56 : P_{229441} &= \mathbf{P}(0, 0, \epsilon^{47}, 1) = \mathbf{P}(0, 0, 55, 1) \\
32 : P_{131137} &= \mathbf{P}(0, 0, \epsilon^{11}, 1) = \mathbf{P}(0, 0, 31, 1) & 57 : P_{233537} &= \mathbf{P}(0, 0, \epsilon^{42}, 1) = \mathbf{P}(0, 0, 56, 1) \\
33 : P_{135233} &= \mathbf{P}(0, 0, \epsilon^5, 1) = \mathbf{P}(0, 0, 32, 1) & 58 : P_{237633} &= \mathbf{P}(0, 0, \epsilon^{21}, 1) = \mathbf{P}(0, 0, 57, 1) \\
34 : P_{139329} &= \mathbf{P}(0, 0, \epsilon^6, 1) = \mathbf{P}(0, 0, 33, 1) & 59 : P_{241729} &= \mathbf{P}(0, 0, \epsilon^{14}, 1) = \mathbf{P}(0, 0, 58, 1) \\
35 : P_{143425} &= \mathbf{P}(0, 0, \epsilon^{44}, 1) = \mathbf{P}(0, 0, 34, 1) & 60 : P_{245825} &= \mathbf{P}(0, 0, \epsilon^{25}, 1) = \mathbf{P}(0, 0, 59, 1) \\
36 : P_{147521} &= \mathbf{P}(0, 0, \epsilon^7, 1) = \mathbf{P}(0, 0, 35, 1) & 61 : P_{249921} &= \mathbf{P}(0, 0, \epsilon^{50}, 1) = \mathbf{P}(0, 0, 60, 1) \\
37 : P_{151617} &= \mathbf{P}(0, 0, \epsilon^{36}, 1) = \mathbf{P}(0, 0, 36, 1) & 62 : P_{254017} &= \mathbf{P}(0, 0, \epsilon^{28}, 1) = \mathbf{P}(0, 0, 61, 1) \\
38 : P_{155713} &= \mathbf{P}(0, 0, \epsilon^{45}, 1) = \mathbf{P}(0, 0, 37, 1) & 63 : P_{258113} &= \mathbf{P}(0, 0, \epsilon^{12}, 1) = \mathbf{P}(0, 0, 62, 1) \\
39 : P_{159809} &= \mathbf{P}(0, 0, \epsilon^{23}, 1) = \mathbf{P}(0, 0, 38, 1) & 64 : P_{262209} &= \mathbf{P}(0, 0, \epsilon^{10}, 1) = \mathbf{P}(0, 0, 63, 1) \\
40 : P_{163905} &= \mathbf{P}(0, 0, \epsilon^8, 1) = \mathbf{P}(0, 0, 39, 1)
\end{aligned}$$

## The 64 Lines

The lines and their Pluecker coordinates are:

$$\begin{aligned}
\ell_0 &= \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{4160} = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{4160} = \mathbf{Pl}(0, 0, 0, 0, 1, 0)_{4225} \\
\ell_1 &= \begin{bmatrix} 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{17043520} = \begin{bmatrix} 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{17043520} = \mathbf{Pl}(0, 0, 0, 1, 0, 0)_{129} \\
\ell_2 &= \begin{bmatrix} 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{17047616} = \begin{bmatrix} 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{17047616} = \mathbf{Pl}(0, 1, 0, 0, 0, 0)_1 \\
\ell_3 &= \begin{bmatrix} 1 & 1 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{274625} = \begin{bmatrix} 1 & 1 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{274625} = \mathbf{Pl}(0, 1, 0, 1, 1, 0)_{12417} \\
\ell_4 &= \begin{bmatrix} 1 & \epsilon^{25} & \epsilon^{29} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{7439867} = \begin{bmatrix} 1 & 59 & 27 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{7439867} = \mathbf{Pl}(0, 27, 0, 59, 1, 0)_{19809} \\
\ell_5 &= \begin{bmatrix} 1 & \epsilon^{14} & \epsilon^{18} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{3174842} = \begin{bmatrix} 1 & 58 & 11 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{3174842} = \mathbf{Pl}(0, 11, 0, 58, 1, 0)_{19666} \\
\ell_6 &= \begin{bmatrix} 1 & \epsilon^{58} & \epsilon^{19} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{5875331} = \begin{bmatrix} 1 & 3 & 22 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{5875331} = \mathbf{Pl}(0, 22, 0, 3, 1, 0)_{12692} \\
\ell_7 &= \begin{bmatrix} 1 & \epsilon & \epsilon^{25} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{15724418} = \begin{bmatrix} 1 & 2 & 59 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{15724418} = \mathbf{Pl}(0, 59, 0, 2, 1, 0)_{12602} \\
\ell_8 &= \begin{bmatrix} 1 & \epsilon^{36} & \epsilon^{45} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{10007204} = \begin{bmatrix} 1 & 36 & 37 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{10007204} = \mathbf{Pl}(0, 37, 0, 36, 1, 0)_{16898} \\
\ell_9 &= \begin{bmatrix} 1 & \epsilon^{45} & \epsilon^{54} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{2821157} = \begin{bmatrix} 1 & 37 & 10 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{2821157} = \mathbf{Pl}(0, 10, 0, 37, 1, 0)_{16998}
\end{aligned}$$

$$\begin{aligned}
\ell_{10} &= \begin{bmatrix} 1 & \epsilon^{41} & \epsilon^{23} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{10240220} = \begin{bmatrix} 1 & 28 & 38 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{10240220} = \mathbf{Pl}(0, 38, 0, 28, 1, 0)_{15883} \\
\ell_{11} &= \begin{bmatrix} 1 & \epsilon^{13} & \epsilon^{58} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{923741} = \begin{bmatrix} 1 & 29 & 3 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{923741} = \mathbf{Pl}(0, 3, 0, 29, 1, 0)_{15975} \\
\ell_{12} &= \begin{bmatrix} 1 & \epsilon^{23} & \epsilon^{26} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{6287270} = \begin{bmatrix} 1 & 38 & 23 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{6287270} = \mathbf{Pl}(0, 23, 0, 38, 1, 0)_{17138} \\
\ell_{13} &= \begin{bmatrix} 1 & \epsilon^8 & \epsilon^{11} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{8421863} = \begin{bmatrix} 1 & 39 & 31 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{8421863} = \mathbf{Pl}(0, 31, 0, 39, 1, 0)_{17273} \\
\ell_{14} &= \begin{bmatrix} 1 & \epsilon^{49} & \epsilon^{18} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{3058334} = \begin{bmatrix} 1 & 30 & 11 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{3058334} = \mathbf{Pl}(0, 11, 0, 30, 1, 0)_{16110} \\
\ell_{15} &= \begin{bmatrix} 1 & \epsilon^{11} & \epsilon^{43} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{4660319} = \begin{bmatrix} 1 & 31 & 17 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{4660319} = \mathbf{Pl}(0, 17, 0, 31, 1, 0)_{16243} \\
\ell_{16} &= \begin{bmatrix} 1 & \epsilon^{12} & \epsilon^{40} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{3990398} = \begin{bmatrix} 1 & 62 & 14 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{3990398} = \mathbf{Pl}(0, 14, 0, 62, 1, 0)_{20177} \\
\ell_{17} &= \begin{bmatrix} 1 & \epsilon^{10} & \epsilon^{38} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{13847807} = \begin{bmatrix} 1 & 63 & 51 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{13847807} = \mathbf{Pl}(0, 51, 0, 63, 1, 0)_{20341} \\
\ell_{18} &= \begin{bmatrix} 1 & \epsilon^{59} & \epsilon^{37} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{10947590} = \begin{bmatrix} 1 & 6 & 41 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{10947590} = \mathbf{Pl}(0, 41, 0, 6, 1, 0)_{13092} \\
\ell_{19} &= \begin{bmatrix} 1 & \epsilon^{39} & \epsilon^{17} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{14147399} = \begin{bmatrix} 1 & 7 & 53 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{14147399} = \mathbf{Pl}(0, 53, 0, 7, 1, 0)_{13231} \\
\ell_{20} &= \begin{bmatrix} 1 & \epsilon^{50} & \epsilon^{58} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{1052732} = \begin{bmatrix} 1 & 60 & 3 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{1052732} = \mathbf{Pl}(0, 3, 0, 60, 1, 0)_{19912} \\
\ell_{21} &= \begin{bmatrix} 1 & \epsilon^{28} & \epsilon^{36} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{9844925} = \begin{bmatrix} 1 & 61 & 36 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{9844925} = \mathbf{Pl}(0, 36, 0, 61, 1, 0)_{20072} \\
\ell_{22} &= \begin{bmatrix} 1 & \epsilon^2 & \epsilon^{50} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{15999044} = \begin{bmatrix} 1 & 4 & 60 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{15999044} = \mathbf{Pl}(0, 60, 0, 4, 1, 0)_{12857} \\
\ell_{23} &= \begin{bmatrix} 1 & \epsilon^{53} & \epsilon^{38} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{13606469} = \begin{bmatrix} 1 & 5 & 51 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{13606469} = \mathbf{Pl}(0, 51, 0, 5, 1, 0)_{12975} \\
\ell_{24} &= \begin{bmatrix} 1 & \epsilon^7 & \epsilon^9 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{12666083} = \begin{bmatrix} 1 & 35 & 47 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{12666083} = \mathbf{Pl}(0, 47, 0, 35, 1, 0)_{16781} \\
\ell_{25} &= \begin{bmatrix} 1 & \epsilon^{44} & \epsilon^{46} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{11596706} = \begin{bmatrix} 1 & 34 & 43 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{11596706} = \mathbf{Pl}(0, 43, 0, 34, 1, 0)_{16650} \\
\ell_{26} &= \begin{bmatrix} 1 & \epsilon^{29} & \epsilon^{41} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{7573019} = \begin{bmatrix} 1 & 27 & 28 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{7573019} = \mathbf{Pl}(0, 28, 0, 27, 1, 0)_{15746} \\
\ell_{27} &= \begin{bmatrix} 1 & \epsilon^{32} & \epsilon^{44} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{9166682} = \begin{bmatrix} 1 & 26 & 34 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{9166682} = \mathbf{Pl}(0, 34, 0, 26, 1, 0)_{15625} \\
\ell_{28} &= \begin{bmatrix} 1 & \epsilon^6 & \epsilon^{20} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{11858849} = \begin{bmatrix} 1 & 33 & 44 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{11858849} = \mathbf{Pl}(0, 44, 0, 33, 1, 0)_{16524} \\
\ell_{29} &= \begin{bmatrix} 1 & \epsilon^5 & \epsilon^{19} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{5996000} = \begin{bmatrix} 1 & 32 & 22 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{5996000} = \mathbf{Pl}(0, 22, 0, 32, 1, 0)_{16375} \\
\ell_{30} &= \begin{bmatrix} 1 & \epsilon^{61} & \epsilon^{50} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{16082264} = \begin{bmatrix} 1 & 24 & 60 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{16082264} = \mathbf{Pl}(0, 60, 0, 24, 1, 0)_{15397}
\end{aligned}$$

$$\begin{aligned}
\ell_{31} &= \begin{bmatrix} 1 & \epsilon^{51} & \epsilon^{40} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{3836441} = \begin{bmatrix} 1 & 25 & 14 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{3836441} = \mathbf{Pl}(0, 14, 0, 25, 1, 0)_{15478} \\
\ell_{32} &= \begin{bmatrix} 1 & \epsilon^{15} & \epsilon^{34} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{2488277} = \begin{bmatrix} 1 & 21 & 9 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{2488277} = \mathbf{Pl}(0, 9, 0, 21, 1, 0)_{14965} \\
\ell_{33} &= \begin{bmatrix} 1 & \epsilon^{55} & \epsilon^{11} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{8342804} = \begin{bmatrix} 1 & 20 & 31 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{8342804} = \mathbf{Pl}(0, 31, 0, 20, 1, 0)_{14860} \\
\ell_{34} &= \begin{bmatrix} 1 & \epsilon^{24} & \epsilon^{17} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{14305517} = \begin{bmatrix} 1 & 45 & 53 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{14305517} = \mathbf{Pl}(0, 53, 0, 45, 1, 0)_{18057} \\
\ell_{35} &= \begin{bmatrix} 1 & \epsilon^{20} & \epsilon^{13} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{7910060} = \begin{bmatrix} 1 & 44 & 29 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{7910060} = \mathbf{Pl}(0, 29, 0, 44, 1, 0)_{17906} \\
\ell_{36} &= \begin{bmatrix} 1 & \epsilon^{19} & \epsilon^{46} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{11546774} = \begin{bmatrix} 1 & 22 & 43 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{11546774} = \mathbf{Pl}(0, 43, 0, 22, 1, 0)_{15126} \\
\ell_{37} &= \begin{bmatrix} 1 & \epsilon^{26} & \epsilon^{53} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{1431383} = \begin{bmatrix} 1 & 23 & 5 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{1431383} = \mathbf{Pl}(0, 5, 0, 23, 1, 0)_{15215} \\
\ell_{38} &= \begin{bmatrix} 1 & \epsilon^{27} & \epsilon^{45} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{10048814} = \begin{bmatrix} 1 & 46 & 37 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{10048814} = \mathbf{Pl}(0, 37, 0, 46, 1, 0)_{18168} \\
\ell_{39} &= \begin{bmatrix} 1 & \epsilon^9 & \epsilon^{27} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{12449711} = \begin{bmatrix} 1 & 47 & 46 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{12449711} = \mathbf{Pl}(0, 46, 0, 47, 1, 0)_{18304} \\
\ell_{40} &= \begin{bmatrix} 1 & \epsilon^3 & \epsilon^{10} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{16814600} = \begin{bmatrix} 1 & 8 & 63 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{16814600} = \mathbf{Pl}(0, 63, 0, 8, 1, 0)_{13368} \\
\ell_{41} &= \begin{bmatrix} 1 & \epsilon^{34} & \epsilon^{41} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{7498121} = \begin{bmatrix} 1 & 9 & 28 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{7498121} = \mathbf{Pl}(0, 28, 0, 9, 1, 0)_{13460} \\
\ell_{42} &= \begin{bmatrix} 1 & \epsilon^{57} & \epsilon^{20} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{11925425} = \begin{bmatrix} 1 & 49 & 44 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{11925425} = \mathbf{Pl}(0, 44, 0, 49, 1, 0)_{18556} \\
\ell_{43} &= \begin{bmatrix} 1 & \epsilon^{62} & \epsilon^{25} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{15915824} = \begin{bmatrix} 1 & 48 & 59 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{15915824} = \mathbf{Pl}(0, 59, 0, 48, 1, 0)_{18444} \\
\ell_{44} &= \begin{bmatrix} 1 & \epsilon^{54} & \epsilon^{27} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{12295754} = \begin{bmatrix} 1 & 10 & 46 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{12295754} = \mathbf{Pl}(0, 46, 0, 10, 1, 0)_{13605} \\
\ell_{45} &= \begin{bmatrix} 1 & \epsilon^{18} & \epsilon^{54} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{2712971} = \begin{bmatrix} 1 & 11 & 10 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{2712971} = \mathbf{Pl}(0, 10, 0, 11, 1, 0)_{13696} \\
\ell_{46} &= \begin{bmatrix} 1 & \epsilon^{38} & \epsilon^{29} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{7406579} = \begin{bmatrix} 1 & 51 & 27 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{7406579} = \mathbf{Pl}(0, 27, 0, 51, 1, 0)_{18793} \\
\ell_{47} &= \begin{bmatrix} 1 & \epsilon^{52} & \epsilon^{43} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{4739378} = \begin{bmatrix} 1 & 50 & 17 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{4739378} = \mathbf{Pl}(0, 17, 0, 50, 1, 0)_{18656} \\
\ell_{48} &= \begin{bmatrix} 1 & \epsilon^{22} & \epsilon^{23} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{10202771} = \begin{bmatrix} 1 & 19 & 38 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{10202771} = \mathbf{Pl}(0, 38, 0, 19, 1, 0)_{14740} \\
\ell_{49} &= \begin{bmatrix} 1 & \epsilon^{35} & \epsilon^{36} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{9666002} = \begin{bmatrix} 1 & 18 & 36 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{9666002} = \mathbf{Pl}(0, 36, 0, 18, 1, 0)_{14611} \\
\ell_{50} &= \begin{bmatrix} 1 & \epsilon^{16} & \epsilon^{22} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{5238698} = \begin{bmatrix} 1 & 42 & 19 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{5238698} = \mathbf{Pl}(0, 19, 0, 42, 1, 0)_{17642} \\
\ell_{51} &= \begin{bmatrix} 1 & \epsilon^{46} & \epsilon^{52} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{13498283} = \begin{bmatrix} 1 & 43 & 50 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{13498283} = \mathbf{Pl}(0, 50, 0, 43, 1, 0)_{17800}
\end{aligned}$$

$$\begin{aligned}
\ell_{52} &= \begin{bmatrix} 1 & \epsilon^4 & \epsilon^{37} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{10989200} = \begin{bmatrix} 1 & 16 & 41 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{10989200} = \mathbf{Pl}(0, 41, 0, 16, 1, 0)_{14362} \\
\ell_{53} &= \begin{bmatrix} 1 & \epsilon^{43} & \epsilon^{13} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{7797713} = \begin{bmatrix} 1 & 17 & 29 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{7797713} = \mathbf{Pl}(0, 29, 0, 17, 1, 0)_{14477} \\
\ell_{54} &= \begin{bmatrix} 1 & \epsilon^{56} & \epsilon^9 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{12686888} = \begin{bmatrix} 1 & 40 & 47 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{12686888} = \mathbf{Pl}(0, 47, 0, 40, 1, 0)_{17416} \\
\ell_{55} &= \begin{bmatrix} 1 & \epsilon^{37} & \epsilon^{53} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{1506281} = \begin{bmatrix} 1 & 41 & 5 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{1506281} = \mathbf{Pl}(0, 5, 0, 41, 1, 0)_{17501} \\
\ell_{56} &= \begin{bmatrix} 1 & \epsilon^{48} & \epsilon^{34} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{2463311} = \begin{bmatrix} 1 & 15 & 9 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{2463311} = \mathbf{Pl}(0, 9, 0, 15, 1, 0)_{14203} \\
\ell_{57} &= \begin{bmatrix} 1 & \epsilon^{40} & \epsilon^{26} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{6187406} = \begin{bmatrix} 1 & 14 & 23 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{6187406} = \mathbf{Pl}(0, 23, 0, 14, 1, 0)_{14090} \\
\ell_{58} &= \begin{bmatrix} 1 & \epsilon^{30} & \epsilon^5 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{8750582} = \begin{bmatrix} 1 & 54 & 32 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{8750582} = \mathbf{Pl}(0, 32, 0, 54, 1, 0)_{19179} \\
\ell_{59} &= \begin{bmatrix} 1 & \epsilon^{47} & \epsilon^{22} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{5292791} = \begin{bmatrix} 1 & 55 & 19 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{5292791} = \mathbf{Pl}(0, 19, 0, 55, 1, 0)_{19293} \\
\ell_{60} &= \begin{bmatrix} 1 & \epsilon^{60} & \epsilon^{10} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{16831244} = \begin{bmatrix} 1 & 12 & 63 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{16831244} = \mathbf{Pl}(0, 63, 0, 12, 1, 0)_{13876} \\
\ell_{61} &= \begin{bmatrix} 1 & \epsilon^{31} & \epsilon^{44} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{9112589} = \begin{bmatrix} 1 & 13 & 34 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{9112589} = \mathbf{Pl}(0, 34, 0, 13, 1, 0)_{13974} \\
\ell_{62} &= \begin{bmatrix} 1 & \epsilon^{33} & \epsilon^5 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{8742260} = \begin{bmatrix} 1 & 52 & 32 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{8742260} = \mathbf{Pl}(0, 32, 0, 52, 1, 0)_{18925} \\
\ell_{63} &= \begin{bmatrix} 1 & \epsilon^{17} & \epsilon^{52} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{13539893} = \begin{bmatrix} 1 & 53 & 50 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{13539893} = \mathbf{Pl}(0, 50, 0, 53, 1, 0)_{19070}
\end{aligned}$$

Rank of lines: ( 4160, 17043520, 17047616, 274625, 7439867, 3174842, 5875331, 15724418, 10007204, 2821157, 10240220, 923741, 6287270, 8421863, 3058334, 4660319, 3990398, 13847807, 10947590, 14147399, 1052732, 9844925, 15999044, 13606469, 12666083, 11596706, 7573019, 9166682, 11858849, 5996000, 16082264, 3836441, 2488277, 8342804, 14305517, 7910060, 11546774, 1431383, 10048814, 12449711, 16814600, 7498121, 11925425, 15915824, 12295754, 2712971, 7406579, 4739378, 10202771, 9666002, ...9112589, 8742260, 13539893 )

Rank of points on Klein quadric: ( 4225, 129, 1, 12417, 19809, 19666, 12692, 12602, 16898, 16998, 15883, 15975, 17138, 17273, 16110, 16243, 20177, 20341, 13092, 13231, 19912, 20072, 12857, 12975, 16781, 16650, 15746, 15625, 16524, 16375, 15397, 15478, 14965, 14860, 18057, 17906, 15126, 15215, 18168, 18304, 13368, 13460, 18556, 18444, 13605, 13696, 18793, 18656, 14740, 14611, ...13974, 18925, 19070 )

### Eckardt Points

The surface has 0 Eckardt points:

### Double Points

The surface has 0 Double points:

The double points on the surface are:

### **Single Points**

The surface has 4096 single points:  
Too many to print.

### **Points on surface but on no line**

The surface has 0 points not on any line:  
The points on the surface but not on lines are:

## Line Intersection Graph

[illegible]

Line 0 intersects

Line 1 intersects

Line 2 intersects

Line 3 intersects

Line 4 intersects

Line 5 intersects

Line 6 intersects

Line 7 intersects

Line 8 intersects

Line 9 intersects

Line 10 intersects

Line 11 intersects

8



[illegible][illegible][illegible][illegible][illegible][illegible][illegible][illegible][illegible][illegible][illegible][illegible][illegible]

[illegible][illegible][illegible]

|      |          |          |          |          |          |          |          |          |          |          |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |        |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------|
| Line | $\ell_0$ | $\ell_1$ | $\ell_2$ | $\ell_3$ | $\ell_4$ | $\ell_5$ | $\ell_6$ | $\ell_7$ | $\ell_8$ | $\ell_9$ | $\ell_{10}$ | $\ell_{11}$ | $\ell_{12}$ | $\ell_{13}$ | $\ell_{14}$ | $\ell_{15}$ | $\ell_{16}$ | $\ell_{17}$ | $\ell_{18}$ | $\ell_{19}$ | $\ell_{20}$ | $\ell_{21}$ | $\ell_{22}$ | $\ell_{23}$ | $\ell_{24}$ | $\ell_{25}$ | $\ell_{26}$ | $\ell_{27}$ | $\ell_{28}$ | $\ell_{29}$ | $\ell_{30}$ | $\ell_{31}$ | $\ell_{32}$ | $\ell_{33}$ | $\ell_{34}$ | $\ell_{35}$ | $\ell_{36}$ | $\ell_{37}$ | $\ell_{38}$ | $\ell_{39}$ | $\ell_{40}$ | $\ell_{41}$ | $\ell_{42}$ | $\ell_{43}$ | $\ell_{44}$ | $\ell_{45}$ | $\ell_{46}$ | $\ell_{47}$ | $\ell_{48}$ | $\ell_{49}$ | $\ell_{50}$ | $\ell_{51}$ | $\ell_{52}$ | $\ell_{53}$ | $\ell_{54}$ | $\ell_{55}$ | $\ell_{56}$ | $\ell_{57}$ | $\ell_{58}$ | $\ell_{59}$ | $\ell_{60}$ | $\ell_{61}$ | $\ell_{62}$ | $\ell_{63}$ | $\ell_{64}$ | $\ell_{65}$ | $\ell_{66}$ | $\ell_{67}$ | $\ell_{68}$ | $\ell_{69}$ | $\ell_{70}$ | $\ell_{71}$ | $\ell_{72}$ | $\ell_{73}$ | $\ell_{74}$ | $\ell_{75}$ | $\ell_{76}$ | $\ell_{77}$ | $\ell_{78}$ | $\ell_{79}$ | $\ell_{80}$ | $\ell_{81}$ | $\ell_{82}$ | $\ell_{83}$ | $\ell_{84}$ | $\ell_{85}$ | $\ell_{86}$ | $\ell_{87}$ | $\ell_{88}$ | $\ell_{89}$ | $\ell_{90}$ | $\ell_{91}$ | $\ell_{92}$ | $\ell_{93}$ | $\ell_{94}$ | $\ell_{95}$ | $\ell_{96}$ | $\ell_{97}$ | $\ell_{98}$ | $\ell_{99}$ | $\ell_{100}$ | $\ell_{101}$ | $\ell_{102}$ | $\ell_{103}$ | $\ell_{104}$ | $\ell_{105}$ | $\ell_{106}$ | $\ell_{107}$ | $\ell_{108}$ | $\ell_{109}$ | $\ell_{110}$ | $\ell_{111}$ | $\ell_{112}$ | $\ell_{113}$ | $\ell_{114}$ | $\ell_{115}$ | $\ell_{116}$ | $\ell_{117}$ | $\ell_{118}$ | $\ell_{119}$ | $\ell_{120}$ | $\ell_{121}$ | $\ell_{122}$ | $\ell_{123}$ | $\ell_{124}$ | $\ell_{125}$ | $\ell_{126}$ | $\ell_{127}$ | $\ell_{128}$ | $\ell_{129}$ | $\ell_{130}$ | $\ell_{131}$ | $\ell_{132}$ | $\ell_{133}$ | $\ell_{134}$ | $\ell_{135}$ | $\ell_{136}$ | $\ell_{137}$ | $\ell_{138}$ | $\ell_{139}$ | $\ell_{140}$ | $\ell_{141}$ | $\ell_{142}$ | $\ell_{143}$ | $\ell_{144}$ | $\ell_{145}$ | $\ell_{146}$ | $\ell_{147}$ | $\ell_{148}$ | $\ell_{149}$ | $\ell_{150}$ | $\ell_{151}$ | $\ell_{152}$ | $\ell_{153}$ | $\ell_{154}$ | $\ell_{155}$ | $\ell_{156}$ | $\ell_{157}$ | $\ell_{158}$ | $\ell_{159}$ | $\ell_{160}$ | $\ell_{161}$ | $\ell_{162}$ | $\ell_{163}$ | $\ell_{164}$ | $\ell_{165}$ | $\ell_{166}$ | $\ell_{167}$ | $\ell_{168}$ | $\ell_{169}$ | $\ell_{170}$ | $\ell_{171}$ | $\ell_{172}$ | $\ell_{173}$ | $\ell_{174}$ | $\ell_{175}$ | $\ell_{176}$ | $\ell_{177}$ | $\ell_{178}$ | $\ell_{179}$ | $\ell_{180}$ | $\ell_{181}$ | $\ell_{182}$ | $\ell_{183}$ | $\ell_{184}$ | $\ell_{185}$ | $\ell_{186}$ | $\ell_{187}$ | $\ell_{188}$ | $\ell_{189}$ | $\ell_{190}$ | $\ell_{191}$ | $\ell_{192}$ | $\ell_{193}$ | $\ell_{194}$ | $\ell_{195}$ | $\ell_{196}$ | $\ell_{197}$ | $\ell_{198}$ | $\ell_{199}$ | $\ell_{200}$ | $\ell_{201}$ | $\ell_{202}$ | $\ell_{203}$ | $\ell_{204}$ | $\ell_{205}$ | $\ell_{206}$ | $\ell_{207}$ | $\ell_{208}$ | $\ell_{209}$ | $\ell_{210}$ | $\ell_{211}$ | $\ell_{212}$ | $\ell_{213}$ | $\ell_{214}$ | $\ell_{215}$ | $\ell_{216}$ | $\ell_{217}$ | $\ell_{218}$ | $\ell_{219}$ | $\ell_{220}$ | $\ell_{221}$ | $\ell_{222}$ | $\ell_{223}$ | $\ell_{224}$ | $\ell_{225}$ | $\ell_{226}$ | $\ell_{227}$ | $\ell_{228}$ | $\ell_{229}$ | $\ell_{230}$ | $\ell_{231}$ | $\ell_{232}$ | $\ell_{233}$ | $\ell_{234}$ | $\ell_{235}$ | $\ell_{236}$ | $\ell_{237}$ | $\ell_{238}$ | $\ell_{239}$ | $\ell_{240}$ | $\ell_{241}$ | $\ell_{242}$ | $\ell_{243}$ | $\ell_{244}$ | $\ell_{245}$ | $\ell_{246}$ | $\ell_{247}$ | $\ell_{248}$ | $\ell_{249}$ | $\ell_{250}$ | $\ell_{251}$ | $\ell_{252}$ | $\ell_{253}$ | $\ell_{254}$ | $\ell_{255}$ | $\ell_{256}$ | $\ell_{257}$ | $\ell_{258}$ | $\ell_{259}$ | $\ell_{260}$ | $\ell_{261}$ | $\ell_{262}$ | $\ell_{263}$ | $\ell_{264}$ | $\ell_{265}$ | $\ell_{266}$ | $\ell_{267}$ | $\ell_{268}$ | $\ell_{269}$ | $\ell_{270}$ | $\ell_{271}$ | $\ell_{272}$ | $\ell_{273}$ | $\ell_{274}$ | $\ell_{275}$ | $\ell_{276}$ | $\ell_{277}$ | $\ell_{278}$ | $\ell_{279}$ | $\ell_{280}$ | $\ell_{281}$ | $\ell_{282}$ | $\ell_{283}$ | $\ell_{284}$ | $\ell_{285}$ | $\ell_{286}$ | $\ell_{287}$ | $\ell_{288}$ | $\ell_{289}$ | $\ell_{290}$ | $\ell_{291}$ | $\ell_{292}$ | $\ell_{293}$ | $\ell_{294}$ | $\ell_{295}$ | $\ell_{296}$ | $\ell_{297}$ | $\ell_{298}$ | $\ell$ |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------|

[illegible][illegible][illegible][illegible][illegible][illegible][illegible][illegible][illegible]



[illegible][illegible][illegible][illegible][illegible][illegible]

|      |          |          |          |          |          |          |          |          |          |          |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |              |        |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------|
| Line | $\ell_0$ | $\ell_1$ | $\ell_2$ | $\ell_3$ | $\ell_4$ | $\ell_5$ | $\ell_6$ | $\ell_7$ | $\ell_8$ | $\ell_9$ | $\ell_{10}$ | $\ell_{11}$ | $\ell_{12}$ | $\ell_{13}$ | $\ell_{14}$ | $\ell_{15}$ | $\ell_{16}$ | $\ell_{17}$ | $\ell_{18}$ | $\ell_{19}$ | $\ell_{20}$ | $\ell_{21}$ | $\ell_{22}$ | $\ell_{23}$ | $\ell_{24}$ | $\ell_{25}$ | $\ell_{26}$ | $\ell_{27}$ | $\ell_{28}$ | $\ell_{29}$ | $\ell_{30}$ | $\ell_{31}$ | $\ell_{32}$ | $\ell_{33}$ | $\ell_{34}$ | $\ell_{35}$ | $\ell_{36}$ | $\ell_{37}$ | $\ell_{38}$ | $\ell_{39}$ | $\ell_{40}$ | $\ell_{41}$ | $\ell_{42}$ | $\ell_{43}$ | $\ell_{44}$ | $\ell_{45}$ | $\ell_{46}$ | $\ell_{47}$ | $\ell_{48}$ | $\ell_{49}$ | $\ell_{50}$ | $\ell_{51}$ | $\ell_{52}$ | $\ell_{53}$ | $\ell_{54}$ | $\ell_{55}$ | $\ell_{56}$ | $\ell_{57}$ | $\ell_{58}$ | $\ell_{59}$ | $\ell_{60}$ | $\ell_{61}$ | $\ell_{62}$ | $\ell_{63}$ | $\ell_{64}$ | $\ell_{65}$ | $\ell_{66}$ | $\ell_{67}$ | $\ell_{68}$ | $\ell_{69}$ | $\ell_{70}$ | $\ell_{71}$ | $\ell_{72}$ | $\ell_{73}$ | $\ell_{74}$ | $\ell_{75}$ | $\ell_{76}$ | $\ell_{77}$ | $\ell_{78}$ | $\ell_{79}$ | $\ell_{80}$ | $\ell_{81}$ | $\ell_{82}$ | $\ell_{83}$ | $\ell_{84}$ | $\ell_{85}$ | $\ell_{86}$ | $\ell_{87}$ | $\ell_{88}$ | $\ell_{89}$ | $\ell_{90}$ | $\ell_{91}$ | $\ell_{92}$ | $\ell_{93}$ | $\ell_{94}$ | $\ell_{95}$ | $\ell_{96}$ | $\ell_{97}$ | $\ell_{98}$ | $\ell_{99}$ | $\ell_{100}$ | $\ell_{101}$ | $\ell_{102}$ | $\ell_{103}$ | $\ell_{104}$ | $\ell_{105}$ | $\ell_{106}$ | $\ell_{107}$ | $\ell_{108}$ | $\ell_{109}$ | $\ell_{110}$ | $\ell_{111}$ | $\ell_{112}$ | $\ell_{113}$ | $\ell_{114}$ | $\ell_{115}$ | $\ell_{116}$ | $\ell_{117}$ | $\ell_{118}$ | $\ell_{119}$ | $\ell_{120}$ | $\ell_{121}$ | $\ell_{122}$ | $\ell_{123}$ | $\ell_{124}$ | $\ell_{125}$ | $\ell_{126}$ | $\ell_{127}$ | $\ell_{128}$ | $\ell_{129}$ | $\ell_{130}$ | $\ell_{131}$ | $\ell_{132}$ | $\ell_{133}$ | $\ell_{134}$ | $\ell_{135}$ | $\ell_{136}$ | $\ell_{137}$ | $\ell_{138}$ | $\ell_{139}$ | $\ell_{140}$ | $\ell_{141}$ | $\ell_{142}$ | $\ell_{143}$ | $\ell_{144}$ | $\ell_{145}$ | $\ell_{146}$ | $\ell_{147}$ | $\ell_{148}$ | $\ell_{149}$ | $\ell_{150}$ | $\ell_{151}$ | $\ell_{152}$ | $\ell_{153}$ | $\ell_{154}$ | $\ell_{155}$ | $\ell_{156}$ | $\ell_{157}$ | $\ell_{158}$ | $\ell_{159}$ | $\ell_{160}$ | $\ell_{161}$ | $\ell_{162}$ | $\ell_{163}$ | $\ell_{164}$ | $\ell_{165}$ | $\ell_{166}$ | $\ell_{167}$ | $\ell_{168}$ | $\ell_{169}$ | $\ell_{170}$ | $\ell_{171}$ | $\ell_{172}$ | $\ell_{173}$ | $\ell_{174}$ | $\ell_{175}$ | $\ell_{176}$ | $\ell_{177}$ | $\ell_{178}$ | $\ell_{179}$ | $\ell_{180}$ | $\ell_{181}$ | $\ell_{182}$ | $\ell_{183}$ | $\ell_{184}$ | $\ell_{185}$ | $\ell_{186}$ | $\ell_{187}$ | $\ell_{188}$ | $\ell_{189}$ | $\ell_{190}$ | $\ell_{191}$ | $\ell_{192}$ | $\ell_{193}$ | $\ell_{194}$ | $\ell_{195}$ | $\ell_{196}$ | $\ell_{197}$ | $\ell_{198}$ | $\ell_{199}$ | $\ell_{200}$ | $\ell_{201}$ | $\ell_{202}$ | $\ell_{203}$ | $\ell_{204}$ | $\ell_{205}$ | $\ell_{206}$ | $\ell_{207}$ | $\ell_{208}$ | $\ell_{209}$ | $\ell_{210}$ | $\ell_{211}$ | $\ell_{212}$ | $\ell_{213}$ | $\ell_{214}$ | $\ell_{215}$ | $\ell_{216}$ | $\ell_{217}$ | $\ell_{218}$ | $\ell_{219}$ | $\ell_{220}$ | $\ell_{221}$ | $\ell_{222}$ | $\ell_{223}$ | $\ell_{224}$ | $\ell_{225}$ | $\ell_{226}$ | $\ell_{227}$ | $\ell_{228}$ | $\ell_{229}$ | $\ell_{230}$ | $\ell_{231}$ | $\ell_{232}$ | $\ell_{233}$ | $\ell_{234}$ | $\ell_{235}$ | $\ell_{236}$ | $\ell_{237}$ | $\ell_{238}$ | $\ell_{239}$ | $\ell_{240}$ | $\ell_{241}$ | $\ell_{242}$ | $\ell_{243}$ | $\ell_{244}$ | $\ell_{245}$ | $\ell_{246}$ | $\ell_{247}$ | $\ell_{248}$ | $\ell_{249}$ | $\ell_{250}$ | $\ell_{251}$ | $\ell_{252}$ | $\ell_{253}$ | $\ell_{254}$ | $\ell_{255}$ | $\ell_{256}$ | $\ell_{257}$ | $\ell_{258}$ | $\ell_{259}$ | $\ell_{260}$ | $\ell_{261}$ | $\ell_{262}$ | $\ell_{263}$ | $\ell_{264}$ | $\ell_{265}$ | $\ell_{266}$ | $\ell_{267}$ | $\ell_{268}$ | $\ell_{269}$ | $\ell_{270}$ | $\ell_{271}$ | $\ell_{272}$ | $\ell_{273}$ | $\ell_{274}$ | $\ell_{275}$ | $\ell_{276}$ | $\ell_{277}$ | $\ell_{278}$ | $\ell_{279}$ | $\ell_{280}$ | $\ell_{281}$ | $\ell_{282}$ | $\ell_{283}$ | $\ell_{284}$ | $\ell_{285}$ | $\ell_{286}$ | $\ell_{287}$ | $\ell_{288}$ | $\ell_{289}$ | $\ell_{290}$ | $\ell_{291}$ | $\ell_{292}$ | $\ell_{293}$ | $\ell_{294}$ | $\ell_{295}$ | $\ell_{296}$ | $\ell_{297}$ | $\ell_{298}$ | $\ell$ |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------|

[illegible][illegible][illegible][illegible][illegible][illegible]

Too many to print.