Rank-74105 over GF(64)

January 15, 2021

The equation

The equation of the surface is :

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

(0, 1, 1, 0, 1, 1, 1, 0, 1, 0, 0, 0, 0, 1, 0, 0, 1, 0, 0, 0)
The point rank of the equation over GF(64) is -2113658747

General information

Number of lines	27
Number of points	4545
Number of singular points	0
Number of Eckardt points	13
Number of double points	96
Number of single points	1524
Number of points off lines	2912
Number of Hesse planes	0
Number of axes	16
Type of points on lines	65^{27}
Type of lines on points	3^{13}, 2^{96}, 1^{1524}, 0^{2912}

Singular Points

The surface has 0 singular points:

The 27 Lines

The lines and their Pluecker coordinates are:

$$\ell_0 = a_1 = \begin{bmatrix} 1 & 0 & \epsilon^{18} & \epsilon^{42} \\ 0 & 1 & \epsilon^{9} & 0 \end{bmatrix}_{14958842} = \begin{bmatrix} 1 & 0 & 11 & 56 \\ 0 & 1 & 47 & 0 \end{bmatrix}_{14958842} = \mathbf{Pl}(54, 52, 10, 45, 0, 1)_{461786}$$

$$\ell_1 = a_2 = \begin{bmatrix} 1 & 0 & \epsilon^{45} & \epsilon^{41} \\ 0 & 1 & \epsilon^{18} & \epsilon^{54} \end{bmatrix}_{7611120} = \begin{bmatrix} 1 & 0 & 37 & 28 \\ 0 & 1 & 11 & 10 \end{bmatrix}_{7611120} = \mathbf{Pl}(2, 48, 16, 6, 47, 1)_{12669118}$$

$$\ell_2 = a_3 = \left[\begin{array}{cccc} 1 & 0 & \epsilon^{18} & \epsilon^{21} \\ 0 & 1 & \epsilon^{36} & 1 \end{array}\right]_{15225199} = \left[\begin{array}{cccc} 1 & 0 & 11 & 57 \\ 0 & 1 & 36 & 1 \end{array}\right]_{15225199} = \mathbf{Pl}(16,6,12,8,37,1)_{10030755}$$

$$\ell_3 = a_4 = \left[\begin{array}{cccc} 1 & 0 & \epsilon^{9} & \epsilon^{21} \\ 0 & 1 & \epsilon^{36} & 0 \end{array}\right]_{15374931} = \left[\begin{array}{cccc} 1 & 0 & 47 & 57 \\ 0 & 1 & 36 & 0 \end{array}\right]_{15374931} = \mathbf{Pl}(21,15,46,62,0,1)_{531494}$$

$$\ell_4 = a_5 = \left[\begin{array}{cccc} 1 & 0 & \epsilon^{54} & \epsilon^{52} \\ 0 & 1 & \epsilon^{9} & \epsilon^{27} \end{array}\right]_{13359801} = \left[\begin{array}{cccc} 1 & 0 & 10 & 50 \\ 0 & 1 & 47 & 46 \end{array}\right]_{13359801} = \mathbf{Pl}(26,13,4,24,36,1)_{9738067}$$

$$\ell_5 = a_6 = \left[\begin{array}{cccc} 1 & 0 & \epsilon^{9} & \epsilon^{42} \\ 0 & 1 & \epsilon^{18} & 1 \end{array}\right]_{15108666} = \left[\begin{array}{cccc} 1 & 0 & 47 & 56 \\ 0 & 1 & 11 & 1 \end{array}\right]_{15108666} = \mathbf{Pl}(4,24,54,52,10,1)_{3119769}$$

$$\ell_6 = b_1 = \left[\begin{array}{cccc} 1 & 0 & \epsilon^{54} & \epsilon^{38} \\ 0 & 1 & \epsilon^{9} & \epsilon^{27} \end{array}\right]_{13626105} = \left[\begin{array}{cccc} 1 & 0 & 10 & 51 \\ 0 & 1 & 47 & 46 \end{array}\right]_{13626105} = \mathbf{Pl}(16,6,42,55,36,1)_{9887115}$$

$$\ell_7 = b_2 = \left[\begin{array}{cccc} 1 & 0 & \epsilon^{9} & \epsilon^{21} \\ 0 & 1 & \epsilon^{18} & 1 \end{array}\right]_{15374970} = \left[\begin{array}{cccc} 1 & 0 & 47 & 57 \\ 0 & 1 & 11 & 1 \end{array}\right]_{15374970} = \mathbf{Pl}(42,55,25,62,10,1)_{3008360}$$

$$\ell_8 = b_3 = \left[\begin{array}{cccc} 1 & 0 & \epsilon^{9} & \epsilon^{42} \\ 0 & 1 & \epsilon^{36} & 0 \end{array}\right]_{15108627} = \left[\begin{array}{cccc} 1 & 0 & 47 & 56 \\ 0 & 1 & 36 & 0 \end{array}\right]_{15108627} = \mathbf{Pl}(49,33,46,52,0,1)_{491832}$$

$$\ell_9 = b_4 = \left[\begin{array}{cccc} 1 & 0 & \epsilon^{18} & \epsilon^{42} \\ 0 & 1 & \epsilon^{36} & 1 \end{array}\right]_{14958895} = \left[\begin{array}{cccc} 1 & 0 & 11 & 56 \\ 0 & 1 & 36 & 1 \end{array}\right]_{14958895} = \mathbf{Pl}(26,13,7,45,37,1)_{10011550}$$

$$\ell_{10} = b_5 = \left[\begin{array}{cccc} 1 & 0 & \epsilon^{18} & \epsilon^{21} \\ 0 & 1 & \epsilon^{9} & 0 \end{array}\right]_{15225146} = \left[\begin{array}{cccc} 1 & 0 & 11 & 57 \\ 0 & 1 & 47 & 0 \end{array}\right]_{15225146} = \mathbf{Pl}(25,62,10,8,0,1)_{314904}$$

$$\ell_{11} = b_6 = \left[\begin{array}{cccc} 1 & 0 & \epsilon^{45} & \epsilon^{13} \\ 0 & 1 & \epsilon^{18} & \epsilon^{54} \end{array}\right]_{7877424} = \left[\begin{array}{cccc} 1 & 0 & 37 & 29 \\ 0 & 1 & 11 & 10 \end{array}\right]_{7877424} = \mathbf{Pl}(39,20,26,13,47,1)_{12706010}$$

$$\ell_{12} = c_{12} = \left[\begin{array}{cccc} 1 & 0 & \epsilon^{27} & \epsilon^{26} \\ 0 & 1 & \epsilon^{36} & \epsilon^{45} \end{array}\right]_{6318802} = \left[\begin{array}{cccc} 1 & 0 & 46 & 23 \\ 0 & 1 & 36 & 37 \end{array}\right]_{6318802} = \mathbf{Pl}(42,55,2,48,11,1)_{3177515}$$

$$\ell_{13} = c_{13} = \left[\begin{array}{cccc} 1 & 0 & \epsilon^{36} & \epsilon^{42} \\ 0 & 1 & \epsilon^{18} & 0 \end{array}\right]_{15062831} = \left[\begin{array}{cccc} 1 & 0 & 36 & 56 \\ 0 & 1 & 11 & 0 \end{array}\right]_{15062831} = \mathbf{Pl}(7,45,37,33,0,1)_{415812}$$

$$\ell_{14} = c_{14} = \left[\begin{array}{cccc} 1 & 0 & \epsilon^{27} & \epsilon^{19} \\ 0 & 1 & \epsilon^{18} & \epsilon^{18} \end{array}\right]_{6050809} = \left[\begin{array}{cccc} 1 & 0 & 46 & 22 \\ 0 & 1 & 11 & 11 \end{array}\right]_{6050809} = \mathbf{Pl}(54,52,39,20,10,1)_{3060914}$$

$$\ell_{15} = c_{15} = \left[\begin{array}{cccc} 0 & 1 & \epsilon^{9} & 0 \\ 0 & 0 & 0 & 1 \end{array}\right]_{17046575} = \left[\begin{array}{cccc} 0 & 1 & 47 & 0 \\ 0 & 0 & 0 & 1 \end{array}\right]_{17046575} = \mathbf{Pl}(0,47,0,1,0,0)_{239}$$

$$\ell_{16} = c_{16} = \left[\begin{array}{cccc} 1 & 0 & \epsilon^{54} & \epsilon^{38} \\ 0 & 1 & \epsilon^{36} & \epsilon^{36} \end{array}\right]_{13625454} = \left[\begin{array}{cccc} 1 & 0 & 10 & 51 \\ 0 & 1 & 36 & 36 \end{array}\right]_{13625454} = \mathbf{Pl}(12,8,42,55,37,1)_{10150955}$$

$$\ell_{17} = c_{23} = \left[\begin{array}{cccc} 1 & 0 & \epsilon^{36} & \epsilon^{21} \\ 0 & 1 & \epsilon^{9} & 1 \end{array}\right]_{15329235} = \left[\begin{array}{cccc} 1 & 0 & 36 & 57 \\ 0 & 1 & 47 & 1 \end{array}\right]_{15329235} = \mathbf{Pl}(2,48,21,15,46,1)_{12427261}$$

$$\ell_{18} = c_{24} = \left[\begin{array}{cccc} 1 & 0 & \epsilon^{45} & \epsilon^{41} \\ 0 & 1 & \epsilon^{9} & \epsilon^{9} \end{array}\right]_{7613524} = \left[\begin{array}{cccc} 1 & 0 & 37 & 28 \\ 0 & 1 & 47 & 47 \end{array}\right]_{7613524} = \mathbf{Pl}(21,15,16,6,46,1)_{12405041}$$

$$\ell_{19} = c_{25} = \left[\begin{array}{cccc} 1 & 0 & \epsilon^{54} & \epsilon^{52} \\ 0 & 1 & \epsilon^{36} & \epsilon^{36} \end{array}\right]_{13359150} = \left[\begin{array}{cccc} 1 & 0 & 10 & 50 \\ 0 & 1 & 36 & 36 \end{array}\right]_{13359150} = \mathbf{Pl}(7,45,4,24,37,1)_{10000569}$$

$$\ell_{20} = c_{26} = \left[\begin{array}{cccc} 0 & 1 & \epsilon^{18} & 0 \\ 0 & 0 & 0 & 1 \end{array}\right]_{17044235} = \left[\begin{array}{cccc} 0 & 1 & 11 & 0 \\ 0 & 0 & 0 & 1 \end{array}\right]_{17044235} = \mathbf{Pl}(0,11,0,1,0,0)_{203}$$

$$\ell_{21} = c_{34} = \left[\begin{array}{cccc} 0 & 1 & \epsilon^{36} & 0 \\ 0 & 0 & 0 & 1 \end{array}\right]_{17045860} = \left[\begin{array}{cccc} 0 & 1 & 36 & 0 \\ 0 & 0 & 0 & 1 \end{array}\right]_{17045860} = \mathbf{Pl}(0,36,0,1,0,0)_{228}$$

$$\ell_{22} = c_{35} = \left[\begin{array}{cccc} 1 & 0 & \epsilon^{27} & \epsilon^{26} \\ 0 & 1 & \epsilon^{18} & \epsilon^{18} \end{array}\right]_{6317113} = \left[\begin{array}{cccc} 1 & 0 & 46 & 23 \\ 0 & 1 & 11 & 11 \end{array}\right]_{6317113} = \mathbf{Pl}(25,62,2,48,10,1)_{2918127}$$

$$\ell_{23} = c_{36} = \begin{bmatrix} 1 & 0 & \epsilon^{45} & \epsilon^{13} \\ 0 & 1 & \epsilon^{9} & \epsilon^{9} \end{bmatrix}_{7879828} = \begin{bmatrix} 1 & 0 & 37 & 29 \\ 0 & 1 & 47 & 47 \end{bmatrix}_{7879828} = \mathbf{Pl}(49, 33, 26, 13, 46, 1)_{12444570}$$

$$\ell_{24} = c_{45} = \begin{bmatrix} 1 & 0 & \epsilon^{36} & \epsilon^{21} \\ 0 & 1 & \epsilon^{18} & 0 \end{bmatrix}_{15329135} = \begin{bmatrix} 1 & 0 & 36 & 57 \\ 0 & 1 & 11 & 0 \end{bmatrix}_{15329135} = \mathbf{Pl}(12, 8, 37, 15, 0, 1)_{344375}$$

$$\ell_{25} = c_{46} = \begin{bmatrix} 1 & 0 & \epsilon^{36} & \epsilon^{42} \\ 0 & 1 & \epsilon^{9} & 1 \end{bmatrix}_{15062931} = \begin{bmatrix} 1 & 0 & 36 & 56 \\ 0 & 1 & 47 & 1 \end{bmatrix}_{15062931} = \mathbf{Pl}(39, 20, 49, 33, 46, 1)_{12534902}$$

$$\ell_{26} = c_{56} = \begin{bmatrix} 1 & 0 & \epsilon^{27} & \epsilon^{19} \\ 0 & 1 & \epsilon^{36} & \epsilon^{45} \end{bmatrix}_{6052498} = \begin{bmatrix} 1 & 0 & 46 & 22 \\ 0 & 1 & 36 & 37 \end{bmatrix}_{6052498} = \mathbf{Pl}(4, 24, 39, 20, 11, 1)_{3324393}$$

Rank of lines: (14958842, 7611120, 15225199, 15374931, 13359801, 15108666, 13626105, 15374970, 15108627, 14958895, 15225146, 7877424, 6318802, 15062831, 6050809, 17046575, 13625454, 15329235, 7613524, 13359150, 17044235, 17045860, 6317113, 7879828, 15329135, 15062931, 6052498)
Rank of points on Klein quadric: (461786, 12669118, 10030755, 531494, 9738067, 3119769, 9887115, 3008360, 491832, 10011550, 314904, 12706010, 3177515, 415812, 3060914, 239, 10150955, 12427261, 12405041, 10000569, 203, 228, 2918127, 12444570, 344375, 12534902, 3324393)

Eckardt Points

The surface has 13 Eckardt points:
$0 : E_{15,26,34} = c_{15} \cap c_{26} \cap c_{34} = P_3 = \mathbf{P}(0,0,0,1) = \mathbf{P}(0,0,0,1)$,
$1 : E_{15} = a_1 \cap b_5 \cap c_{15} = P_{707} = \mathbf{P}(0,\epsilon^{54},1,0) = \mathbf{P}(0,10,1,0)$,
$2 : E_{13,26,45} = c_{13} \cap c_{26} \cap c_{45} = P_{2435} = \mathbf{P}(0,\epsilon^{45},1,0) = \mathbf{P}(0,37,1,0)$,
$3 : E_{43} = a_4 \cap b_3 \cap c_{34} = P_{3011} = \mathbf{P}(0,\epsilon^{27},1,0) = \mathbf{P}(0,46,1,0)$,
$4 : E_{15,24,36} = c_{15} \cap c_{24} \cap c_{36} = P_{8897} = \mathbf{P}(0,\epsilon^{54},1,1) = \mathbf{P}(0,10,1,1)$,
$5 : E_{14,26,35} = c_{14} \cap c_{26} \cap c_{35} = P_{10625} = \mathbf{P}(0,\epsilon^{45},1,1) = \mathbf{P}(0,37,1,1)$,
$6 : E_{16,25,34} = c_{16} \cap c_{25} \cap c_{34} = P_{11201} = \mathbf{P}(0,\epsilon^{27},1,1) = \mathbf{P}(0,46,1,1)$,
$7 : E_{12,34,56} = c_{12} \cap c_{34} \cap c_{56} = P_{45825} = \mathbf{P}(0,\epsilon^{18},\epsilon^{54},1) = \mathbf{P}(0,11,10,1)$,
$8 : E_{62} = a_6 \cap b_2 \cap c_{26} = P_{49281} = \mathbf{P}(0,1,\epsilon^{18},1) = \mathbf{P}(0,1,11,1)$,
$9 : E_{34} = a_3 \cap b_4 \cap c_{34} = P_{151681} = \mathbf{P}(0,1,\epsilon^{36},1) = \mathbf{P}(0,1,36,1)$,
$10 : E_{51} = a_5 \cap b_1 \cap c_{15} = P_{158017} = \mathbf{P}(0,\epsilon^{36},\epsilon^{45},1) = \mathbf{P}(0,36,37,1)$,
$11 : E_{26} = a_2 \cap b_6 \cap c_{26} = P_{195585} = \mathbf{P}(0,\epsilon^{9},\epsilon^{27},1) = \mathbf{P}(0,47,46,1)$,
$12 : E_{15,23,46} = c_{15} \cap c_{23} \cap c_{46} = P_{196737} = \mathbf{P}(0,1,\epsilon^{9},1) = \mathbf{P}(0,1,47,1)$.

Double Points

The surface has 96 Double points:
The double points on the surface are:

$P_{208570} = (57,57,49,1) = \ell_0 \cap \ell_7 = a_1 \cap b_2$
$P_{37434} = (57,7,8,1) = \ell_0 \cap \ell_8 = a_1 \cap b_3$
$P_{32890} = (57,0,7,1) = \ell_0 \cap \ell_9 = a_1 \cap b_4$
$P_{262138} = (57,62,62,1) = \ell_0 \cap \ell_{11} = a_1 \cap b_6$
$P_{226362} = (57,15,54,1) = \ell_0 \cap \ell_{12} = a_1 \cap c_{12}$
$P_{68794} = (57,49,15,1) = \ell_0 \cap \ell_{13} = a_1 \cap c_{13}$
$P_{7675} = (57,54,0,1) = \ell_0 \cap \ell_{14} = a_1 \cap c_{14}$
$P_{238202} = (57,8,57,1) = \ell_0 \cap \ell_{16} = a_1 \cap c_{16}$
$P_{187936} = (31,55,44,1) = \ell_1 \cap \ell_6 = a_2 \cap b_1$
$P_{205434} = (57,8,49,1) = \ell_1 \cap \ell_8 = a_2 \cap b_3$
$P_{246972} = (59,17,59,1) = \ell_1 \cap \ell_9 = a_2 \cap b_4$
$P_{220537} = (56,52,52,1) = \ell_1 \cap \ell_{10} = a_2 \cap b_5$
$P_{135677} = (60,6,32,1) = \ell_1 \cap \ell_{12} = a_2 \cap c_{12}$
$P_{4331} = (41,2,0,1) = \ell_1 \cap \ell_{17} = a_2 \cap c_{23}$
$P_{69716} = (19,0,16,1) = \ell_1 \cap \ell_{18} = a_2 \cap c_{24}$
$P_{166115} = (34,34,39,1) = \ell_1 \cap \ell_{19} = a_2 \cap c_{25}$
$P_{5205} = (19,16,0,1) = \ell_2 \cap \ell_6 = a_3 \cap b_1$
$P_{254186} = (41,2,61,1) = \ell_2 \cap \ell_7 = a_3 \cap b_2$
$P_{53369} = (56,0,12,1) = \ell_2 \cap \ell_{10} = a_3 \cap b_5$
$P_{132896} = (31,27,31,1) = \ell_2 \cap \ell_{11} = a_3 \cap b_6$
$P_{229050} = (57,57,54,1) = \ell_2 \cap \ell_{13} = a_3 \cap c_{13}$
$P_{150268} = (59,42,35,1) = \ell_2 \cap \ell_{17} = a_3 \cap c_{23}$
$P_{162301} = (60,38,38,1) = \ell_2 \cap \ell_{22} = a_3 \cap c_{35}$
$P_{164259} = (34,5,39,1) = \ell_2 \cap \ell_{23} = a_3 \cap c_{36}$

$P_{141497} = (56, 33, 33, 1) = \ell_3 \cap \ell_6 = a_4 \cap b_1$
$P_{106617} = (56, 0, 25, 1) = \ell_3 \cap \ell_7 = a_4 \cap b_2$
$P_{189305} = (56, 12, 45, 1) = \ell_3 \cap \ell_{10} = a_4 \cap b_5$
$P_{93113} = (56, 45, 21, 1) = \ell_3 \cap \ell_{11} = a_4 \cap b_6$
$P_{236921} = (56, 52, 56, 1) = \ell_3 \cap \ell_{14} = a_4 \cap c_{14}$
$P_{5562} = (56, 21, 0, 1) = \ell_3 \cap \ell_{18} = a_4 \cap c_{24}$
$P_{218809} = (56, 25, 52, 1) = \ell_3 \cap \ell_{24} = a_4 \cap c_{45}$
$P_{56953} = (56, 56, 12, 1) = \ell_3 \cap \ell_{25} = a_4 \cap c_{46}$
$P_{143779} = (34, 5, 34, 1) = \ell_4 \cap \ell_7 = a_5 \cap b_2$
$P_{66618} = (57, 15, 15, 1) = \ell_4 \cap \ell_8 = a_5 \cap b_3$
$P_{5886} = (60, 26, 0, 1) = \ell_4 \cap \ell_9 = a_5 \cap b_4$
$P_{42620} = (59, 24, 9, 1) = \ell_4 \cap \ell_{11} = a_5 \cap b_6$
$P_{20576} = (31, 0, 4, 1) = \ell_4 \cap \ell_{19} = a_5 \cap c_{25}$
$P_{70932} = (19, 19, 16, 1) = \ell_4 \cap \ell_{22} = a_5 \cap c_{35}$
$P_{56697} = (56, 52, 12, 1) = \ell_4 \cap \ell_{24} = a_5 \cap c_{45}$
$P_{263530} = (41, 20, 63, 1) = \ell_4 \cap \ell_{26} = a_5 \cap c_{56}$
$P_{174890} = (41, 43, 41, 1) = \ell_5 \cap \ell_6 = a_6 \cap b_1$
$P_{225402} = (57, 0, 54, 1) = \ell_5 \cap \ell_8 = a_6 \cap b_3$
$P_{80419} = (34, 39, 18, 1) = \ell_5 \cap \ell_9 = a_6 \cap b_4$
$P_{93817} = (56, 56, 21, 1) = \ell_5 \cap \ell_{10} = a_6 \cap b_5$
$P_{69908} = (19, 3, 16, 1) = \ell_5 \cap \ell_{16} = a_6 \cap c_{16}$
$P_{74940} = (59, 17, 17, 1) = \ell_5 \cap \ell_{23} = a_6 \cap c_{36}$
$P_{243453} = (60, 26, 58, 1) = \ell_5 \cap \ell_{25} = a_6 \cap c_{46}$
$P_{4449} = (31, 4, 0, 1) = \ell_5 \cap \ell_{26} = a_6 \cap c_{56}$
$P_{224355} = (34, 48, 53, 1) = \ell_6 \cap \ell_{12} = b_1 \cap c_{12}$
$P_{36858} = (57, 62, 7, 1) = \ell_6 \cap \ell_{13} = b_1 \cap c_{13}$
$P_{114557} = (60, 60, 26, 1) = \ell_6 \cap \ell_{14} = b_1 \cap c_{14}$
$P_{176252} = (59, 0, 42, 1) = \ell_6 \cap \ell_{16} = b_1 \cap c_{16}$
$P_{6909} = (59, 42, 0, 1) = \ell_7 \cap \ell_{12} = b_2 \cap c_{12}$
$P_{128084} = (19, 16, 30, 1) = \ell_7 \cap \ell_{17} = b_2 \cap c_{23}$
$P_{116512} = (31, 27, 27, 1) = \ell_7 \cap \ell_{18} = b_2 \cap c_{24}$
$P_{113149} = (60, 38, 26, 1) = \ell_7 \cap \ell_{19} = b_2 \cap c_{25}$
$P_{261626} = (57, 54, 62, 1) = \ell_8 \cap \ell_{13} = b_3 \cap c_{13}$
$P_{36538} = (57, 57, 7, 1) = \ell_8 \cap \ell_{17} = b_3 \cap c_{23}$
$P_{241658} = (57, 62, 57, 1) = \ell_8 \cap \ell_{22} = b_3 \cap c_{35}$
$P_{7355} = (57, 49, 0, 1) = \ell_8 \cap \ell_{23} = b_3 \cap c_{36}$
$P_{16660} = (19, 3, 3, 1) = \ell_9 \cap \ell_{14} = b_4 \cap c_{14}$
$P_{15146} = (41, 43, 2, 1) = \ell_9 \cap \ell_{18} = b_4 \cap c_{24}$
$P_{110201} = (56, 56, 25, 1) = \ell_9 \cap \ell_{24} = b_4 \cap c_{45}$
$P_{168288} = (31, 4, 40, 1) = \ell_9 \cap \ell_{25} = b_4 \cap c_{46}$
$P_{236473} = (56, 45, 56, 1) = \ell_{10} \cap \ell_{19} = b_5 \cap c_{25}$
$P_{5818} = (56, 25, 0, 1) = \ell_{10} \cap \ell_{22} = b_5 \cap c_{35}$
$P_{140729} = (56, 21, 33, 1) = \ell_{10} \cap \ell_{24} = b_5 \cap c_{45}$
$P_{108729} = (56, 33, 25, 1) = \ell_{10} \cap \ell_{26} = b_5 \cap c_{56}$
$P_{15018} = (41, 41, 2, 1) = \ell_{11} \cap \ell_{16} = b_6 \cap c_{16}$
$P_{110717} = (60, 0, 26, 1) = \ell_{11} \cap \ell_{23} = b_6 \cap c_{36}$
$P_{6692} = (34, 39, 0, 1) = \ell_{11} \cap \ell_{25} = b_6 \cap c_{46}$
$P_{62356} = (19, 13, 14, 1) = \ell_{11} \cap \ell_{26} = b_6 \cap c_{56}$
$P_{12394} = (41, 0, 2, 1) = \ell_{12} \cap \ell_{22} = c_{12} \cap c_{35}$
$P_{22560} = (31, 31, 4, 1) = \ell_{12} \cap \ell_{23} = c_{12} \cap c_{36}$
$P_{191417} = (56, 45, 45, 1) = \ell_{12} \cap \ell_{24} = c_{12} \cap c_{45}$
$P_{82196} = (19, 3, 19, 1) = \ell_{12} \cap \ell_{25} = c_{12} \cap c_{46}$
$P_{238650} = (57, 15, 57, 1) = \ell_{13} \cap \ell_{18} = c_{13} \cap c_{24}$
$P_{4667} = (57, 7, 0, 1) = \ell_{13} \cap \ell_{19} = c_{13} \cap c_{25}$
$P_{204922} = (57, 0, 49, 1) = \ell_{13} \cap \ell_{25} = c_{13} \cap c_{46}$
$P_{37498} = (57, 8, 8, 1) = \ell_{13} \cap \ell_{26} = c_{13} \cap c_{56}$
$P_{22304} = (31, 27, 4, 1) = \ell_{14} \cap \ell_{17} = c_{14} \cap c_{23}$
$P_{77052} = (59, 50, 17, 1) = \ell_{14} \cap \ell_{19} = c_{14} \cap c_{25}$
$P_{181738} = (41, 22, 43, 1) = \ell_{14} \cap \ell_{23} = c_{14} \cap c_{36}$
$P_{163939} = (34, 0, 39, 1) = \ell_{14} \cap \ell_{26} = c_{14} \cap c_{56}$
$P_{24995} = (34, 5, 5, 1) = \ell_{16} \cap \ell_{17} = c_{16} \cap c_{23}$
$P_{161661} = (60, 28, 38, 1) = \ell_{16} \cap \ell_{18} = c_{16} \cap c_{24}$
$P_{118048} = (31, 51, 27, 1) = \ell_{16} \cap \ell_{22} = c_{16} \cap c_{35}$
$P_{4986} = (56, 12, 0, 1) = \ell_{16} \cap \ell_{24} = c_{16} \cap c_{45}$
$P_{90233} = (56, 0, 21, 1) = \ell_{17} \cap \ell_{24} = c_{23} \cap c_{45}$
$P_{252413} = (60, 38, 60, 1) = \ell_{17} \cap \ell_{26} = c_{23} \cap c_{56}$
$P_{26147} = (34, 23, 5, 1) = \ell_{18} \cap \ell_{22} = c_{24} \cap c_{35}$
$P_{180028} = (59, 59, 42, 1) = \ell_{18} \cap \ell_{26} = c_{24} \cap c_{56}$
$P_{18324} = (19, 29, 3, 1) = \ell_{19} \cap \ell_{23} = c_{25} \cap c_{36}$
$P_{183082} = (41, 43, 43, 1) = \ell_{19} \cap \ell_{25} = c_{25} \cap c_{46}$
$P_{177340} = (59, 17, 42, 1) = \ell_{22} \cap \ell_{25} = c_{35} \cap c_{46}$
$P_{235705} = (56, 33, 56, 1) = \ell_{23} \cap \ell_{24} = c_{36} \cap c_{45}$

Single Points

The surface has 1524 single points:
Too many to print.

Points on surface but on no line

The surface has 2912 points not on any line:
Too many to print.

Line Intersection Graph

		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
		a_1	a_2	a_3	a_4	a_5	a_6	b_1	b_2	b_3	b_4	b_5	b_6	c_{12}	c_{13}	c_{14}	c_{15}	c_{16}	c_{23}	c_{24}	c_{25}	c_{26}	c_{34}	c_{35}	c_{36}	c_{45}	c_{46}	c_{56}
0	a_1	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
1	a_2	0	0	0	0	0	0	1	0	1	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	0	0
2	a_3	0	0	0	0	0	0	1	1	0	1	1	1	0	1	0	0	0	1	0	0	0	1	1	1	0	0	0
3	a_4	0	0	0	0	0	0	1	1	1	0	1	1	0	0	1	0	0	0	1	0	0	1	0	0	1	1	0
4	a_5	0	0	0	0	0	0	1	1	1	1	0	1	0	0	0	1	0	0	0	1	0	0	1	0	1	0	1
5	a_6	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	1	0	0	0	1	0	0	1	0	1	1
6	b_1	0	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
7	b_2	1	0	1	1	1	1	0	0	0	0	0	0	1	0	0	0	0	1	1	1	1	0	0	0	0	0	0
8	b_3	1	1	0	1	1	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	1	1	1	0	0	0
9	b_4	1	1	1	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	1	0	0	1	1	0
10	b_5	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	1	0	1	0	1
11	b_6	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	1	0	1	1
12	c_{12}	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
13	c_{13}	1	0	1	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	1	1	1
14	c_{14}	1	0	0	1	0	0	1	0	0	1	0	0	0	0	0	0	0	1	0	1	1	0	1	1	0	0	1
15	c_{15}	1	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	1	1	0	1	1	0	1	0	1	0
16	c_{16}	1	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	1	1	1	0	1	1	0	1	0	0
17	c_{23}	0	1	1	0	0	0	0	1	1	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	1	1	1
18	c_{24}	0	1	0	1	0	0	0	1	0	1	0	0	0	1	0	1	1	0	0	0	0	0	1	1	0	0	1
19	c_{25}	0	1	0	0	1	0	0	1	0	0	1	0	0	1	1	0	1	0	0	0	0	1	0	1	0	1	0
20	c_{26}	0	1	0	0	0	1	0	1	0	0	0	1	0	1	1	1	0	0	0	0	0	1	1	0	1	0	0
21	c_{34}	0	0	1	1	0	0	0	0	1	1	0	0	1	0	0	1	1	0	0	1	1	0	0	0	0	0	1
22	c_{35}	0	0	1	0	1	0	0	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	0	0	0	1	0
23	c_{36}	0	0	1	0	0	1	0	0	1	0	0	1	1	0	1	1	0	0	1	1	0	0	0	0	1	0	0
24	c_{45}	0	0	0	1	1	0	0	0	0	1	1	0	1	1	0	0	1	1	0	0	1	0	0	1	0	0	0
25	c_{46}	0	0	0	1	0	1	0	0	0	1	0	1	1	1	0	1	0	1	0	1	0	0	1	0	0	0	0
26	c_{56}	0	0	0	0	1	1	0	0	0	0	1	1	1	1	1	0	0	1	1	0	0	1	0	0	0	0	0

Neighbor sets in the line intersection graph:
Line 0 intersects

Line	ℓ_7	ℓ_8	ℓ_9	ℓ_{10}	ℓ_{11}	ℓ_{12}	ℓ_{13}	ℓ_{14}	ℓ_{15}	ℓ_{16}
in point	P_{208570}	P_{37434}	P_{32890}	P_{707}	P_{262138}	P_{226362}	P_{68794}	P_{7675}	P_{707}	P_{238202}

Line 1 intersects

Line	ℓ_6	ℓ_8	ℓ_9	ℓ_{10}	ℓ_{11}	ℓ_{12}	ℓ_{17}	ℓ_{18}	ℓ_{19}	ℓ_{20}
in point	P_{187936}	P_{205434}	P_{246972}	P_{220537}	P_{195585}	P_{135677}	P_{4331}	P_{69716}	P_{166115}	P_{195585}

Line 2 intersects

Line	ℓ_6	ℓ_7	ℓ_9	ℓ_{10}	ℓ_{11}	ℓ_{13}	ℓ_{17}	ℓ_{21}	ℓ_{22}	ℓ_{23}
in point	P_{5205}	P_{254186}	P_{151681}	P_{53369}	P_{132896}	P_{229050}	P_{150268}	P_{151681}	P_{162301}	P_{164259}

Line 3 intersects

Line	ℓ_6	ℓ_7	ℓ_8	ℓ_{10}	ℓ_{11}	ℓ_{14}	ℓ_{18}	ℓ_{21}	ℓ_{24}	ℓ_{25}
in point	P_{141497}	P_{106617}	P_{3011}	P_{189305}	P_{93113}	P_{236921}	P_{5562}	P_{3011}	P_{218809}	P_{56953}

Line 4 intersects

Line	ℓ_6	ℓ_7	ℓ_8	ℓ_9	ℓ_{11}	ℓ_{15}	ℓ_{19}	ℓ_{22}	ℓ_{24}	ℓ_{26}
in point	P_{158017}	P_{143779}	P_{66618}	P_{5886}	P_{42620}	P_{158017}	P_{20576}	P_{70932}	P_{56697}	P_{263530}

Line 5 intersects

Line	ℓ_6	ℓ_7	ℓ_8	ℓ_9	ℓ_{10}	ℓ_{16}	ℓ_{20}	ℓ_{23}	ℓ_{25}	ℓ_{26}
in point	P_{174890}	P_{49281}	P_{225402}	P_{80419}	P_{93817}	P_{69908}	P_{49281}	P_{74940}	P_{243453}	P_{4449}

Line 6 intersects

Line	ℓ_1	ℓ_2	ℓ_3	ℓ_4	ℓ_5	ℓ_{12}	ℓ_{13}	ℓ_{14}	ℓ_{15}	ℓ_{16}
in point	P_{187936}	P_{5205}	P_{141497}	P_{158017}	P_{174890}	P_{224355}	P_{36858}	P_{114557}	P_{158017}	P_{176252}

Line 7 intersects

Line	ℓ_0	ℓ_2	ℓ_3	ℓ_4	ℓ_5	ℓ_{12}	ℓ_{17}	ℓ_{18}	ℓ_{19}	ℓ_{20}
in point	P_{208570}	P_{254186}	P_{106617}	P_{143779}	P_{49281}	P_{6909}	P_{128084}	P_{116512}	P_{113149}	P_{49281}

Line 8 intersects

Line	ℓ_0	ℓ_1	ℓ_3	ℓ_4	ℓ_5	ℓ_{13}	ℓ_{17}	ℓ_{21}	ℓ_{22}	ℓ_{23}
in point	P_{37434}	P_{205434}	P_{3011}	P_{66618}	P_{225402}	P_{261626}	P_{36538}	P_{3011}	P_{241658}	P_{7355}

Line 9 intersects

Line	ℓ_0	ℓ_1	ℓ_2	ℓ_4	ℓ_5	ℓ_{14}	ℓ_{18}	ℓ_{21}	ℓ_{24}	ℓ_{25}
in point	P_{32890}	P_{246972}	P_{151681}	P_{5886}	P_{80419}	P_{16660}	P_{15146}	P_{151681}	P_{110201}	P_{168288}

Line 10 intersects

Line	ℓ_0	ℓ_1	ℓ_2	ℓ_3	ℓ_5	ℓ_{15}	ℓ_{19}	ℓ_{22}	ℓ_{24}	ℓ_{26}
in point	P_{707}	P_{220537}	P_{53369}	P_{189305}	P_{93817}	P_{707}	P_{236473}	P_{5818}	P_{140729}	P_{108729}

Line 11 intersects

Line	ℓ_0	ℓ_1	ℓ_2	ℓ_3	ℓ_4	ℓ_{16}	ℓ_{20}	ℓ_{23}	ℓ_{25}	ℓ_{26}
in point	P_{262138}	P_{195585}	P_{132896}	P_{93113}	P_{42620}	P_{15018}	P_{195585}	P_{110717}	P_{6692}	P_{62356}

Line 12 intersects

Line	ℓ_0	ℓ_1	ℓ_6	ℓ_7	ℓ_{21}	ℓ_{22}	ℓ_{23}	ℓ_{24}	ℓ_{25}	ℓ_{26}
in point	P_{226362}	P_{135677}	P_{224355}	P_{6909}	P_{45825}	P_{12394}	P_{22560}	P_{191417}	P_{82196}	P_{45825}

Line 13 intersects

Line	ℓ_0	ℓ_2	ℓ_6	ℓ_8	ℓ_{18}	ℓ_{19}	ℓ_{20}	ℓ_{24}	ℓ_{25}	ℓ_{26}
in point	P_{68794}	P_{229050}	P_{36858}	P_{261626}	P_{238650}	P_{4667}	P_{2435}	P_{2435}	P_{204922}	P_{37498}

Line 14 intersects

Line	ℓ_0	ℓ_3	ℓ_6	ℓ_9	ℓ_{17}	ℓ_{19}	ℓ_{20}	ℓ_{22}	ℓ_{23}	ℓ_{26}
in point	P_{7675}	P_{236921}	P_{114557}	P_{16660}	P_{22304}	P_{77052}	P_{10625}	P_{10625}	P_{181738}	P_{163939}

Line 15 intersects

Line	ℓ_0	ℓ_4	ℓ_6	ℓ_{10}	ℓ_{17}	ℓ_{18}	ℓ_{20}	ℓ_{21}	ℓ_{23}	ℓ_{25}
in point	P_{707}	P_{158017}	P_{158017}	P_{707}	P_{196737}	P_{8897}	P_3	P_3	P_{8897}	P_{196737}

Line 16 intersects

Line	ℓ_0	ℓ_5	ℓ_6	ℓ_{11}	ℓ_{17}	ℓ_{18}	ℓ_{19}	ℓ_{21}	ℓ_{22}	ℓ_{24}
in point	P_{238202}	P_{69908}	P_{176252}	P_{15018}	P_{24995}	P_{161661}	P_{11201}	P_{11201}	P_{118048}	P_{4986}

Line 17 intersects

Line	ℓ_1	ℓ_2	ℓ_7	ℓ_8	ℓ_{14}	ℓ_{15}	ℓ_{16}	ℓ_{24}	ℓ_{25}	ℓ_{26}
in point	P_{4331}	P_{150268}	P_{128084}	P_{36538}	P_{22304}	P_{196737}	P_{24995}	P_{90233}	P_{196737}	P_{252413}

Line 18 intersects

Line	ℓ_1	ℓ_3	ℓ_7	ℓ_9	ℓ_{13}	ℓ_{15}	ℓ_{16}	ℓ_{22}	ℓ_{23}	ℓ_{26}
in point	P_{69716}	P_{5562}	P_{116512}	P_{15146}	P_{238650}	P_{8897}	P_{161661}	P_{26147}	P_{8897}	P_{180028}

Line 19 intersects

Line	ℓ_1	ℓ_4	ℓ_7	ℓ_{10}	ℓ_{13}	ℓ_{14}	ℓ_{16}	ℓ_{21}	ℓ_{23}	ℓ_{25}
in point	P_{166115}	P_{20576}	P_{113149}	P_{236473}	P_{4667}	P_{77052}	P_{11201}	P_{11201}	P_{18324}	P_{183082}

Line 20 intersects

Line	ℓ_1	ℓ_5	ℓ_7	ℓ_{11}	ℓ_{13}	ℓ_{14}	ℓ_{15}	ℓ_{21}	ℓ_{22}	ℓ_{24}
in point	P_{195585}	P_{49281}	P_{49281}	P_{195585}	P_{2435}	P_{10625}	P_3	P_3	P_{10625}	P_{2435}

Line 21 intersects

Line	ℓ_2	ℓ_3	ℓ_8	ℓ_9	ℓ_{12}	ℓ_{15}	ℓ_{16}	ℓ_{19}	ℓ_{20}	ℓ_{26}
in point	P_{151681}	P_{3011}	P_{3011}	P_{151681}	P_{45825}	P_3	P_{11201}	P_{11201}	P_3	P_{45825}

Line 22 intersects

Line	ℓ_2	ℓ_4	ℓ_8	ℓ_{10}	ℓ_{12}	ℓ_{14}	ℓ_{16}	ℓ_{18}	ℓ_{20}	ℓ_{25}
in point	P_{162301}	P_{70932}	P_{241658}	P_{5818}	P_{12394}	P_{10625}	P_{118048}	P_{26147}	P_{10625}	P_{177340}

Line 23 intersects

Line	ℓ_2	ℓ_5	ℓ_8	ℓ_{11}	ℓ_{12}	ℓ_{14}	ℓ_{15}	ℓ_{18}	ℓ_{19}	ℓ_{24}
in point	P_{164259}	P_{74940}	P_{7355}	P_{110717}	P_{22560}	P_{181738}	P_{8897}	P_{8897}	P_{18324}	P_{235705}

Line 24 intersects

Line	ℓ_3	ℓ_4	ℓ_9	ℓ_{10}	ℓ_{12}	ℓ_{13}	ℓ_{16}	ℓ_{17}	ℓ_{20}	ℓ_{23}
in point	P_{218809}	P_{56697}	P_{110201}	P_{140729}	P_{191417}	P_{2435}	P_{4986}	P_{90233}	P_{2435}	P_{235705}

Line 25 intersects

Line	ℓ_3	ℓ_5	ℓ_9	ℓ_{11}	ℓ_{12}	ℓ_{13}	ℓ_{15}	ℓ_{17}	ℓ_{19}	ℓ_{22}
in point	P_{56953}	P_{243453}	P_{168288}	P_{6692}	P_{82196}	P_{204922}	P_{196737}	P_{196737}	P_{183082}	P_{177340}

Line 26 intersects

Line	ℓ_4	ℓ_5	ℓ_{10}	ℓ_{11}	ℓ_{12}	ℓ_{13}	ℓ_{14}	ℓ_{17}	ℓ_{18}	ℓ_{21}
in point	P_{263530}	P_{4449}	P_{108729}	P_{62356}	P_{45825}	P_{37498}	P_{163939}	P_{252413}	P_{180028}	P_{45825}

The surface has 4545 points:
Too many to print.