Rank-74106 over GF(64)

January 15, 2021

The equation

The equation of the surface is :

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

(1, 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 -2113658746

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:

$$\ell_0 = a_1 = \left[\begin{array}{cccc} 1 & 0 & \epsilon^{36} & 0 \\ 0 & 1 & \epsilon^{18} & 0 \end{array}\right]_{149807} = \left[\begin{array}{cccc} 1 & 0 & 36 & 0 \\ 0 & 1 & 11 & 0 \end{array}\right]_{149807} = \mathbf{Pl}(46,0,37,0,0,1)_{275146}$$

$$\ell_1 = a_2 = \left[\begin{array}{cccc} 1 & 0 & \epsilon^{27} & \epsilon^{27} \\ 0 & 1 & \epsilon^{18} & \epsilon^{18} \end{array}\right]_{12442105} = \left[\begin{array}{cccc} 1 & 0 & 46 & 46 \\ 0 & 1 & 11 & 11 \end{array}\right]_{12442105} = \mathbf{Pl}(37,0,1,1,10,1)_{2903335}$$

$$\ell_2 = a_3 = \left[\begin{array}{cccc} 1 & 0 & \epsilon^{45} & \epsilon^{45} \\ 0 & 1 & \epsilon^{18} & \epsilon^{54} \end{array}\right]_{10007856} = \left[\begin{array}{cccc} 1 & 0 & 37 & 37 \\ 0 & 1 & 11 & 10 \end{array}\right]_{10007856} = \mathbf{Pl}(1,1,1,1,47,1)_{12611031}$$

$$\ell_3 = a_4 = \left[\begin{array}{cccc} 0 & 1 & \epsilon^{9} & 0 \\ 0 & 0 & 0 & 1 \end{array}\right]_{17046575} = \left[\begin{array}{cccc} 0 & 1 & 47 & 0 \\ 0 & 0 & 0 & 1 \end{array}\right]_{17046575} = \mathbf{Pl}(0,47,0,1,0,0)_{239}$$

$$\ell_4 = a_5 = \left[\begin{array}{cccc} 1 & 0 & \epsilon^{27} & \epsilon^{9} \\ 0 & 1 & \epsilon^{36} & \epsilon^{45} \end{array}\right]_{12710098} = \left[\begin{array}{cccc} 1 & 0 & 46 & 47 \\ 0 & 1 & 36 & 37 \end{array}\right]_{12710098} = \mathbf{Pl}(36,46,11,37,11,1)_{3214616}$$

$$\ell_5 = a_6 = \left[\begin{array}{cccc} 1 & 0 & \epsilon^{9} & 0 \\ 0 & 1 & \epsilon^{18} & 1 \end{array}\right]_{195642} = \left[\begin{array}{cccc} 1 & 0 & 47 & 0 \\ 0 & 1 & 11 & 1 \end{array}\right]_{195642} = \mathbf{Pl}(1,1,11,0,10,1)_{2895990}$$

$$\ell_6 = b_1 = \left[\begin{array}{cccc} 1 & 0 & \epsilon^{45} & \epsilon^{45} \\ 0 & 1 & \epsilon^{9} & \epsilon^{9} \end{array}\right]_{10010260} = \left[\begin{array}{cccc} 1 & 0 & 37 & 37 \\ 0 & 1 & 47 & 47 \end{array}\right]_{10010260} = \mathbf{Pl}(10,0,1,1,46,1)_{12338188}$$

$$\ell_7 = b_2 = \left[\begin{array}{cccc} 1 & 0 & \epsilon^{36} & 0 \\ 0 & 1 & \epsilon^{9} & 1 \end{array}\right]_{149907} = \left[\begin{array}{cccc} 1 & 0 & 36 & 0 \\ 0 & 1 & 47 & 1 \end{array}\right]_{149907} = \mathbf{Pl}(1,1,47,0,46,1)_{12333138}$$

$$\ell_8 = b_3 = \left[\begin{array}{cccc} 1 & 0 & \epsilon^{54} & \epsilon^{18} \\ 0 & 1 & \epsilon^{9} & \epsilon^{27} \end{array}\right]_{2973945} = \left[\begin{array}{cccc} 1 & 0 & 10 & 11 \\ 0 & 1 & 47 & 46 \end{array}\right]_{2973945} = \mathbf{Pl}(47,10,36,46,36,1)_{9864970}$$

$$\ell_9 = b_4 = \left[\begin{array}{cccc} 1 & 0 & \epsilon^{27} & \epsilon^{27} \\ 0 & 1 & \epsilon^{36} & \epsilon^{45} \end{array}\right]_{12443794} = \left[\begin{array}{cccc} 1 & 0 & 46 & 46 \\ 0 & 1 & 36 & 37 \end{array}\right]_{12443794} = \mathbf{Pl}(1,1,1,1,11,1)_{3173883}$$

$$\ell_{10} = b_5 = \left[\begin{array}{cccc} 0 & 1 & \epsilon^{18} & 0 \\ 0 & 0 & 0 & 1 \end{array}\right]_{17044235} = \left[\begin{array}{cccc} 0 & 1 & 11 & 0 \\ 0 & 0 & 0 & 1 \end{array}\right]_{17044235} = \mathbf{Pl}(0,11,0,1,0,0)_{203}$$

$$\ell_{11} = b_6 = \left[\begin{array}{cccc} 1 & 0 & \epsilon^{18} & 0 \\ 0 & 1 & \epsilon^{9} & 0 \end{array}\right]_{45818} = \left[\begin{array}{cccc} 1 & 0 & 11 & 0 \\ 0 & 1 & 47 & 0 \end{array}\right]_{45818} = \mathbf{Pl}(37,0,10,0,0,1)_{271708}$$

$$\ell_{12} = c_{12} = \left[\begin{array}{cccc} 1 & 0 & \epsilon^{54} & \epsilon^{54} \\ 0 & 1 & \epsilon^{36} & \epsilon^{36} \end{array}\right]_{2706990} = \left[\begin{array}{cccc} 1 & 0 & 10 & 10 \\ 0 & 1 & 36 & 36 \end{array}\right]_{2706990} = \mathbf{Pl}(46,0,1,1,37,1)_{9979504}$$

$$\ell_{13} = c_{13} = \left[\begin{array}{cccc} 1 & 0 & \epsilon^{18} & 1 \\ 0 & 1 & \epsilon^{36} & 1 \end{array}\right]_{312175} = \left[\begin{array}{cccc} 1 & 0 & 11 & 1 \\ 0 & 1 & 36 & 1 \end{array}\right]_{312175} = \mathbf{Pl}(47,10,11,37,37,1)_{10027132}$$

$$\ell_{14} = c_{14} = \left[\begin{array}{cccc} 1 & 0 & \epsilon^{45} & \epsilon^{36} \\ 0 & 1 & \epsilon^{9} & \epsilon^{9} \end{array}\right]_{9743956} = \left[\begin{array}{cccc} 1 & 0 & 37 & 36 \\ 0 & 1 & 47 & 47 \end{array}\right]_{9743956} = \mathbf{Pl}(36,46,47,10,46,1)_{12526394}$$

$$\ell_{15} = c_{15} = \left[\begin{array}{cccc} 1 & 0 & \epsilon^{36} & 1 \\ 0 & 1 & \epsilon^{18} & 0 \end{array}\right]_{416111} = \left[\begin{array}{cccc} 1 & 0 & 36 & 1 \\ 0 & 1 & 11 & 0 \end{array}\right]_{416111} = \mathbf{Pl}(11,37,37,46,0,1)_{467413}$$

$$\ell_{16} = c_{16} = \left[\begin{array}{cccc} 1 & 0 & \epsilon^{9} & 0 \\ 0 & 1 & \epsilon^{36} & 0 \end{array}\right]_{195603} = \left[\begin{array}{cccc} 1 & 0 & 47 & 0 \\ 0 & 1 & 36 & 0 \end{array}\right]_{195603} = \mathbf{Pl}(10,0,46,0,0,1)_{276253}$$

$$\ell_{17} = c_{23} = \left[\begin{array}{cccc} 1 & 0 & \epsilon^{9} & 1 \\ 0 & 1 & \epsilon^{36} & 0 \end{array}\right]_{461907} = \left[\begin{array}{cccc} 1 & 0 & 47 & 1 \\ 0 & 1 & 36 & 0 \end{array}\right]_{461907} = \mathbf{Pl}(36,46,46,10,0,1)_{325121}$$

$$\ell_{18} = c_{24} = \left[\begin{array}{cccc} 1 & 0 & \epsilon^{36} & 1 \\ 0 & 1 & \epsilon^{9} & 1 \end{array}\right]_{416211} = \left[\begin{array}{cccc} 1 & 0 & 36 & 1 \\ 0 & 1 & 47 & 1 \end{array}\right]_{416211} = \mathbf{Pl}(11,37,36,46,46,1)_{12485041}$$

$$\ell_{19} = c_{25} = \left[\begin{array}{cccc} 1 & 0 & \epsilon^{27} & \epsilon^{9} \\ 0 & 1 & \epsilon^{18} & \epsilon^{18} \end{array}\right]_{12708409} = \left[\begin{array}{cccc} 1 & 0 & 46 & 47 \\ 0 & 1 & 11 & 11 \end{array}\right]_{12708409} = \mathbf{Pl}(47,10,11,37,10,1)_{2952610}$$

$$\ell_{20} = c_{26} = \left[\begin{array}{cccc} 1 & 0 & \epsilon^{18} & 0 \\ 0 & 1 & \epsilon^{36} & 1 \end{array}\right]_{45871} = \left[\begin{array}{cccc} 1 & 0 & 11 & 0 \\ 0 & 1 & 36 & 1 \end{array}\right]_{45871} = \mathbf{Pl}(1,1,36,0,37,1)_{9973725}$$

$$\ell_{21} = c_{34} = \left[\begin{array}{cccc} 1 & 0 & \epsilon^{54} & \epsilon^{54} \\ 0 & 1 & \epsilon^{9} & \epsilon^{27} \end{array}\right]_{2707641} = \left[\begin{array}{cccc} 1 & 0 & 10 & 10 \\ 0 & 1 & 47 & 46 \end{array}\right]_{2707641} = \mathbf{Pl}(1,1,1,1,36,1)_{9727584}$$

$$\ell_{22} = c_{35} = \left[\begin{array}{cccc} 1 & 0 & \epsilon^{45} & \epsilon^{36} \\ 0 & 1 & \epsilon^{18} & \epsilon^{54} \end{array}\right]_{9741552} = \left[\begin{array}{cccc} 1 & 0 & 37 & 36 \\ 0 & 1 & 11 & 10 \end{array}\right]_{9741552} = \mathbf{Pl}(11,37,47,10,47,1)_{12788512}$$

$$\ell_{23} = c_{36} = \left[\begin{array}{cccc} 1 & 0 & \epsilon^{54} & \epsilon^{18} \\ 0 & 1 & \epsilon^{36} & \epsilon^{36} \end{array}\right]_{2973294} = \left[\begin{array}{cccc} 1 & 0 & 10 & 11 \\ 0 & 1 & 36 & 36 \end{array}\right]_{2973294} = \mathbf{Pl}(11, 37, 36, 46, 37, 1)_{10126951}$$

$$\ell_{24} = c_{45} = \left[\begin{array}{cccc} 0 & 1 & \epsilon^{36} & 0 \\ 0 & 0 & 0 & 1 \end{array}\right]_{17045860} = \left[\begin{array}{cccc} 0 & 1 & 36 & 0 \\ 0 & 0 & 0 & 1 \end{array}\right]_{17045860} = \mathbf{Pl}(0, 36, 0, 1, 0, 0)_{228}$$

$$\ell_{25} = c_{46} = \left[\begin{array}{cccc} 1 & 0 & \epsilon^{18} & 1 \\ 0 & 1 & \epsilon^{9} & 0 \end{array}\right]_{312122} = \left[\begin{array}{cccc} 1 & 0 & 11 & 1 \\ 0 & 1 & 47 & 0 \end{array}\right]_{312122} = \mathbf{Pl}(47, 10, 10, 37, 0, 1)_{430027}$$

$$\ell_{26} = c_{56} = \left[\begin{array}{cccc} 1 & 0 & \epsilon^{9} & 1 \\ 0 & 1 & \epsilon^{18} & 1 \end{array}\right]_{461946} = \left[\begin{array}{cccc} 1 & 0 & 47 & 1 \\ 0 & 1 & 11 & 1 \end{array}\right]_{461946} = \mathbf{Pl}(36, 46, 47, 10, 10, 1)_{3093845}$$

Rank of lines: (149807, 12442105, 10007856, 17046575, 12710098, 195642, 10010260, 149907, 2973945, 12443794, 17044235, 45818, 2706990, 312175, 9743956, 416111, 195603, 461907, 416211, 12708409, 45871, 2707641, 9741552, 2973294, 17045860, 312122, 461946)
Rank of points on Klein quadric: (275146, 2903335, 12611031, 239, 3214616, 2895990, 12338188, 12333138, 9864970, 3173883, 203, 271708, 9979504, 10027132, 12526394, 467413, 276253, 325121, 12485041, 2952610, 9973725, 9727584, 12788512, 10126951, 228, 430027, 3093845)

Eckardt Points

The surface has 13 Eckardt points:
$0 : E_{45} = a_4 \cap b_5 \cap c_{45} = P_3 = \mathbf{P}(0, 0, 0, 1) = \mathbf{P}(0, 0, 0, 1)$,
$1 : E_{46} = a_4 \cap b_6 \cap c_{46} = P_{707} = \mathbf{P}(0, \epsilon^{54}, 1, 0) = \mathbf{P}(0, 10, 1, 0)$,
$2 : E_{15} = a_1 \cap b_5 \cap c_{15} = P_{2435} = \mathbf{P}(0, \epsilon^{45}, 1, 0) = \mathbf{P}(0, 37, 1, 0)$,
$3 : E_{16,23,45} = c_{16} \cap c_{23} \cap c_{45} = P_{3011} = \mathbf{P}(0, \epsilon^{27}, 1, 0) = \mathbf{P}(0, 46, 1, 0)$,
$4 : E_{41} = a_4 \cap b_1 \cap c_{14} = P_{8897} = \mathbf{P}(0, \epsilon^{54}, 1, 1) = \mathbf{P}(0, 10, 1, 1)$,
$5 : E_{25} = a_2 \cap b_5 \cap c_{25} = P_{10625} = \mathbf{P}(0, \epsilon^{45}, 1, 1) = \mathbf{P}(0, 37, 1, 1)$,
$6 : E_{12,36,45} = c_{12} \cap c_{36} \cap c_{45} = P_{11201} = \mathbf{P}(0, \epsilon^{27}, 1, 1) = \mathbf{P}(0, 46, 1, 1)$,
$7 : E_{54} = a_5 \cap b_4 \cap c_{45} = P_{45825} = \mathbf{P}(0, \epsilon^{18}, \epsilon^{54}, 1) = \mathbf{P}(0, 11, 10, 1)$,
$8 : E_{65} = a_6 \cap b_5 \cap c_{56} = P_{49281} = \mathbf{P}(0, 1, \epsilon^{18}, 1) = \mathbf{P}(0, 1, 11, 1)$,
$9 : E_{13,26,45} = c_{13} \cap c_{26} \cap c_{45} = P_{151681} = \mathbf{P}(0, 1, \epsilon^{36}, 1) = \mathbf{P}(0, 1, 36, 1)$,
$10 : E_{43} = a_4 \cap b_3 \cap c_{34} = P_{158017} = \mathbf{P}(0, \epsilon^{36}, \epsilon^{45}, 1) = \mathbf{P}(0, 36, 37, 1)$,
$11 : E_{35} = a_3 \cap b_5 \cap c_{35} = P_{195585} = \mathbf{P}(0, \epsilon^{9}, \epsilon^{27}, 1) = \mathbf{P}(0, 47, 46, 1)$,
$12 : E_{42} = a_4 \cap b_2 \cap c_{24} = P_{196737} = \mathbf{P}(0, 1, \epsilon^{9}, 1) = \mathbf{P}(0, 1, 47, 1)$.

Double Points

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

$P_{113} = (46, 0, 1, 0) = \ell_0 \cap \ell_7 = a_1 \cap b_2$
$P_{2408} = (37, 36, 1, 0) = \ell_0 \cap \ell_8 = a_1 \cap b_3$
$P_{142} = (11, 1, 1, 0) = \ell_0 \cap \ell_9 = a_1 \cap b_4$
$P_{3111} = (36, 47, 1, 0) = \ell_0 \cap \ell_{11} = a_1 \cap b_6$
$P_{41} = (37, 1, 0, 0) = \ell_0 \cap \ell_{12} = a_1 \cap c_{12}$
$P_{717} = (10, 10, 1, 0) = \ell_0 \cap \ell_{13} = a_1 \cap c_{13}$
$P_{3012} = (1, 46, 1, 0) = \ell_0 \cap \ell_{14} = a_1 \cap c_{14}$
$P_{818} = (47, 11, 1, 0) = \ell_0 \cap \ell_{16} = a_1 \cap c_{16}$
$P_{10571} = (10, 36, 1, 1) = \ell_1 \cap \ell_6 = a_2 \cap b_1$
$P_{8972} = (11, 11, 1, 1) = \ell_1 \cap \ell_8 = a_2 \cap b_3$
$P_{8294} = (36, 0, 1, 1) = \ell_1 \cap \ell_9 = a_2 \cap b_4$
$P_{14} = (10, 1, 0, 0) = \ell_1 \cap \ell_{11} = a_2 \cap b_6$
$P_{11302} = (37, 47, 1, 1) = \ell_1 \cap \ell_{12} = a_2 \cap c_{12}$
$P_{8898} = (1, 10, 1, 1) = \ell_1 \cap \ell_{17} = a_2 \cap c_{23}$
$P_{11248} = (47, 46, 1, 1) = \ell_1 \cap \ell_{18} = a_2 \cap c_{24}$
$P_{8367} = (46, 1, 1, 1) = \ell_1 \cap \ell_{20} = a_2 \cap c_{26}$
$P_{8269} = (11, 0, 1, 1) = \ell_2 \cap \ell_6 = a_3 \cap b_1$
$P_{4262} = (36, 1, 0, 1) = \ell_2 \cap \ell_7 = a_3 \cap b_2$
$P_{158063} = (46, 36, 37, 1) = \ell_2 \cap \ell_9 = a_3 \cap b_4$
$P_{178} = (47, 1, 1, 0) = \ell_2 \cap \ell_{11} = a_3 \cap b_6$
$P_{199664} = (47, 46, 47, 1) = \ell_2 \cap \ell_{13} = a_3 \cap c_{13}$
$P_{153986} = (1, 37, 36, 1) = \ell_2 \cap \ell_{17} = a_3 \cap c_{23}$
$P_{45862} = (37, 11, 10, 1) = \ell_2 \cap \ell_{21} = a_3 \cap c_{34}$
$P_{49867} = (10, 10, 11, 1) = \ell_2 \cap \ell_{23} = a_3 \cap c_{36}$

$P_{11312} = (47, 47, 1, 1) = \ell_4 \cap \ell_6 = a_5 \cap b_1$
$P_{192687} = (46, 1, 46, 1) = \ell_4 \cap \ell_7 = a_5 \cap b_2$
$P_{197349} = (36, 10, 47, 1) = \ell_4 \cap \ell_8 = a_5 \cap b_3$
$P_{781} = (10, 11, 1, 0) = \ell_4 \cap \ell_{11} = a_5 \cap b_6$
$P_{158082} = (1, 37, 37, 1) = \ell_4 \cap \ell_{15} = a_5 \cap c_{15}$
$P_{49227} = (10, 0, 11, 1) = \ell_4 \cap \ell_{19} = a_5 \cap c_{25}$
$P_{154572} = (11, 46, 36, 1) = \ell_4 \cap \ell_{22} = a_5 \cap c_{35}$
$P_{6503} = (37, 36, 0, 1) = \ell_4 \cap \ell_{26} = a_5 \cap c_{56}$
$P_{8358} = (37, 1, 1, 1) = \ell_5 \cap \ell_6 = a_6 \cap b_1$
$P_{155788} = (11, 1, 37, 1) = \ell_5 \cap \ell_7 = a_6 \cap b_2$
$P_{45195} = (10, 1, 10, 1) = \ell_5 \cap \ell_8 = a_6 \cap b_3$
$P_{4273} = (47, 1, 0, 1) = \ell_5 \cap \ell_9 = a_6 \cap b_4$
$P_{77} = (10, 0, 1, 0) = \ell_5 \cap \ell_{16} = a_6 \cap c_{16}$
$P_{192677} = (36, 1, 46, 1) = \ell_5 \cap \ell_{20} = a_6 \cap c_{26}$
$P_{196783} = (46, 1, 47, 1) = \ell_5 \cap \ell_{23} = a_6 \cap c_{36}$
$P_{151682} = (1, 1, 36, 1) = \ell_5 \cap \ell_{25} = a_6 \cap c_{46}$
$P_{9007} = (46, 11, 1, 1) = \ell_6 \cap \ell_{12} = b_1 \cap c_{12}$
$P_{10661} = (36, 37, 1, 1) = \ell_6 \cap \ell_{13} = b_1 \cap c_{13}$
$P_{11202} = (1, 46, 1, 1) = \ell_6 \cap \ell_{15} = b_1 \cap c_{15}$
$P_{50} = (46, 1, 0, 0) = \ell_6 \cap \ell_{16} = b_1 \cap c_{16}$
$P_{8331} = (10, 1, 1, 1) = \ell_7 \cap \ell_{12} = b_2 \cap c_{12}$
$P_{49282} = (1, 1, 11, 1) = \ell_7 \cap \ell_{17} = b_2 \cap c_{23}$
$P_{151718} = (37, 1, 36, 1) = \ell_7 \cap \ell_{19} = b_2 \cap c_{25}$
$P_{45232} = (47, 1, 10, 1) = \ell_7 \cap \ell_{20} = b_2 \cap c_{26}$
$P_{7216} = (46, 47, 0, 1) = \ell_8 \cap \ell_{13} = b_3 \cap c_{13}$
$P_{195522} = (1, 46, 46, 1) = \ell_8 \cap \ell_{17} = b_3 \cap c_{23}$
$P_{51632} = (47, 37, 11, 1) = \ell_8 \cap \ell_{22} = b_3 \cap c_{35}$
$P_{151654} = (37, 0, 36, 1) = \ell_8 \cap \ell_{23} = b_3 \cap c_{36}$
$P_{154022} = (37, 37, 36, 1) = \ell_9 \cap \ell_{14} = b_4 \cap c_{14}$
$P_{49868} = (11, 10, 11, 1) = \ell_9 \cap \ell_{18} = b_4 \cap c_{24}$
$P_{195595} = (10, 47, 46, 1) = \ell_9 \cap \ell_{21} = b_4 \cap c_{34}$
$P_{199618} = (1, 46, 47, 1) = \ell_9 \cap \ell_{25} = b_4 \cap c_{46}$
$P_{2382} = (11, 36, 1, 0) = \ell_{11} \cap \ell_{16} = b_6 \cap c_{16}$
$P_{104} = (37, 0, 1, 0) = \ell_{11} \cap \ell_{20} = b_6 \cap c_{26}$
$P_{2436} = (1, 37, 1, 0) = \ell_{11} \cap \ell_{23} = b_6 \cap c_{36}$
$P_{3057} = (46, 46, 1, 0) = \ell_{11} \cap \ell_{26} = b_6 \cap c_{56}$
$P_{8305} = (47, 0, 1, 1) = \ell_{12} \cap \ell_{21} = c_{12} \cap c_{34}$
$P_{10597} = (36, 36, 1, 1) = \ell_{12} \cap \ell_{22} = c_{12} \cap c_{35}$
$P_{10626} = (1, 37, 1, 1) = \ell_{12} \cap \ell_{25} = c_{12} \cap c_{46}$
$P_{8908} = (11, 10, 1, 1) = \ell_{12} \cap \ell_{26} = c_{12} \cap c_{56}$
$P_{194918} = (37, 36, 46, 1) = \ell_{13} \cap \ell_{18} = c_{13} \cap c_{24}$
$P_{45772} = (11, 10, 10, 1) = \ell_{13} \cap \ell_{19} = c_{13} \cap c_{25}$
$P_{49218} = (1, 0, 11, 1) = \ell_{13} \cap \ell_{25} = c_{13} \cap c_{46}$
$P_{156427} = (10, 11, 37, 1) = \ell_{13} \cap \ell_{26} = c_{13} \cap c_{56}$
$P_{6467} = (1, 36, 0, 1) = \ell_{14} \cap \ell_{17} = c_{14} \cap c_{23}$
$P_{156453} = (36, 11, 37, 1) = \ell_{14} \cap \ell_{19} = c_{14} \cap c_{25}$
$P_{49291} = (10, 1, 11, 1) = \ell_{14} \cap \ell_{20} = c_{14} \cap c_{26}$
$P_{196719} = (46, 0, 47, 1) = \ell_{14} \cap \ell_{22} = c_{14} \cap c_{35}$
$P_{48140} = (11, 47, 10, 1) = \ell_{14} \cap \ell_{23} = c_{14} \cap c_{36}$
$P_{195568} = (47, 46, 46, 1) = \ell_{14} \cap \ell_{26} = c_{14} \cap c_{56}$
$P_{48130} = (1, 47, 10, 1) = \ell_{15} \cap \ell_{17} = c_{15} \cap c_{23}$
$P_{151618} = (1, 0, 36, 1) = \ell_{15} \cap \ell_{18} = c_{15} \cap c_{24}$
$P_{196738} = (1, 1, 47, 1) = \ell_{15} \cap \ell_{20} = c_{15} \cap c_{26}$
$P_{49858} = (1, 10, 11, 1) = \ell_{15} \cap \ell_{21} = c_{15} \cap c_{34}$
$P_{4867} = (1, 11, 0, 1) = \ell_{15} \cap \ell_{23} = c_{15} \cap c_{36}$
$P_{194882} = (1, 36, 46, 1) = \ell_{15} \cap \ell_{25} = c_{15} \cap c_{46}$
$P_{2472} = (37, 37, 1, 0) = \ell_{16} \cap \ell_{18} = c_{16} \cap c_{24}$
$P_{708} = (1, 10, 1, 0) = \ell_{16} \cap \ell_{19} = c_{16} \cap c_{25}$
$P_{167} = (36, 1, 1, 0) = \ell_{16} \cap \ell_{21} = c_{16} \cap c_{34}$
$P_{3121} = (46, 47, 1, 0) = \ell_{16} \cap \ell_{22} = c_{16} \cap c_{35}$
$P_{156418} = (1, 11, 37, 1) = \ell_{17} \cap \ell_{25} = c_{23} \cap c_{46}$
$P_{196674} = (1, 0, 47, 1) = \ell_{17} \cap \ell_{26} = c_{23} \cap c_{56}$
$P_{4876} = (10, 11, 0, 1) = \ell_{18} \cap \ell_{22} = c_{24} \cap c_{35}$
$P_{158117} = (36, 37, 37, 1) = \ell_{18} \cap \ell_{23} = c_{24} \cap c_{36}$
$P_{48175} = (46, 47, 10, 1) = \ell_{18} \cap \ell_{26} = c_{24} \cap c_{56}$
$P_{199663} = (46, 46, 47, 1) = \ell_{19} \cap \ell_{21} = c_{25} \cap c_{34}$
$P_{194928} = (47, 36, 46, 1) = \ell_{19} \cap \ell_{23} = c_{25} \cap c_{36}$
$P_{7171} = (1, 47, 0, 1) = \ell_{19} \cap \ell_{25} = c_{25} \cap c_{46}$
$P_{4237} = (11, 1, 0, 1) = \ell_{20} \cap \ell_{21} = c_{26} \cap c_{34}$
$P_{155814} = (37, 1, 37, 1) = \ell_{20} \cap \ell_{22} = c_{26} \cap c_{35}$
$P_{154021} = (36, 37, 36, 1) = \ell_{21} \cap \ell_{26} = c_{34} \cap c_{56}$
$P_{45762} = (1, 10, 10, 1) = \ell_{22} \cap \ell_{25} = c_{35} \cap c_{46}$

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_{113}	P_{2408}	P_{142}	P_{2435}	P_{3111}	P_{41}	P_{717}	P_{3012}	P_{2435}	P_{818}

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_{10571}	P_{8972}	P_{8294}	P_{10625}	P_{14}	P_{11302}	P_{8898}	P_{11248}	P_{10625}	P_{8367}

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_{8269}	P_{4262}	P_{158063}	P_{195585}	P_{178}	P_{199664}	P_{153986}	P_{45862}	P_{195585}	P_{49867}

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_{8897}	P_{196737}	P_{158017}	P_3	P_{707}	P_{8897}	P_{196737}	P_{158017}	P_3	P_{707}

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_{11312}	P_{192687}	P_{197349}	P_{45825}	P_{781}	P_{158082}	P_{49227}	P_{154572}	P_{45825}	P_{6503}

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_{8358}	P_{155788}	P_{45195}	P_{4273}	P_{49281}	P_{77}	P_{192677}	P_{196783}	P_{151682}	P_{49281}

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_{10571}	P_{8269}	P_{8897}	P_{11312}	P_{8358}	P_{9007}	P_{10661}	P_{8897}	P_{11202}	P_{50}

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_{113}	P_{4262}	P_{196737}	P_{192687}	P_{155788}	P_{8331}	P_{49282}	P_{196737}	P_{151718}	P_{45232}

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_{2408}	P_{8972}	P_{158017}	P_{197349}	P_{45195}	P_{7216}	P_{195522}	P_{158017}	P_{51632}	P_{151654}

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_{142}	P_{8294}	P_{158063}	P_{45825}	P_{4273}	P_{154022}	P_{49868}	P_{195595}	P_{45825}	P_{199618}

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_{2435}	P_{10625}	P_{195585}	P_3	P_{49281}	P_{2435}	P_{10625}	P_{195585}	P_3	P_{49281}

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_{3111}	P_{14}	P_{178}	P_{707}	P_{781}	P_{2382}	P_{104}	P_{2436}	P_{707}	P_{3057}

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_{41}	P_{11302}	P_{9007}	P_{8331}	P_{8305}	P_{10597}	P_{11201}	P_{11201}	P_{10626}	P_{8908}

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_{717}	P_{199664}	P_{10661}	P_{7216}	P_{194918}	P_{45772}	P_{151681}	P_{151681}	P_{49218}	P_{156427}

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_{3012}	P_{8897}	P_{8897}	P_{154022}	P_{6467}	P_{156453}	P_{49291}	P_{196719}	P_{48140}	P_{195568}

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_{2435}	P_{158082}	P_{11202}	P_{2435}	P_{48130}	P_{151618}	P_{196738}	P_{49858}	P_{4867}	P_{194882}

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_{818}	P_{77}	P_{50}	P_{2382}	P_{3011}	P_{2472}	P_{708}	P_{167}	P_{3121}	P_{3011}

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_{8898}	P_{153986}	P_{49282}	P_{195522}	P_{6467}	P_{48130}	P_{3011}	P_{3011}	P_{156418}	P_{196674}

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_{11248}	P_{196737}	P_{196737}	P_{49868}	P_{194918}	P_{151618}	P_{2472}	P_{4876}	P_{158117}	P_{48175}

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_{10625}	P_{49227}	P_{151718}	P_{10625}	P_{45772}	P_{156453}	P_{708}	P_{199663}	P_{194928}	P_{7171}

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_{8367}	P_{192677}	P_{45232}	P_{104}	P_{151681}	P_{49291}	P_{196738}	P_{4237}	P_{155814}	P_{151681}

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_{45862}	P_{158017}	P_{158017}	P_{195595}	P_{8305}	P_{49858}	P_{167}	P_{199663}	P_{4237}	P_{154021}

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_{195585}	P_{154572}	P_{51632}	P_{195585}	P_{10597}	P_{196719}	P_{3121}	P_{4876}	P_{155814}	P_{45762}

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_{49867}	P_{196783}	P_{151654}	P_{2436}	P_{11201}	P_{48140}	P_{4867}	P_{158117}	P_{194928}	P_{11201}

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_3	P_{45825}	P_{45825}	P_3	P_{11201}	P_{151681}	P_{3011}	P_{3011}	P_{151681}	P_{11201}

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_{707}	P_{151682}	P_{199618}	P_{707}	P_{10626}	P_{49218}	P_{194882}	P_{156418}	P_{7171}	P_{45762}

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_{6503}	P_{49281}	P_{49281}	P_{3057}	P_{8908}	P_{156427}	P_{195568}	P_{196674}	P_{48175}	P_{154021}

The surface has 4545 points:
Too many to print.