Rank-76389 over GF(32)

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The equation

The equation of the surface is :

$$X_1^3 + X_0^2X_2 + X_0^2X_3 + X_1^2X_3 + X_1X_2^2 + X_0X_3^2 + X_0X_1X_2 = 0$$

(0, 1, 0, 0, 0, 1, 1, 0, 0, 1, 0, 1, 0, 1, 0, 0, 1, 0, 0, 0)
The point rank of the equation over GF(32) is -2079292347

General information

Number of lines	2
Number of points	1089
Number of singular points	0
Number of Eckardt points	0
Number of double points	1
Number of single points	64
Number of points off lines	1024
Number of Hesse planes	0
Number of axes	0
Type of points on lines	33^2
Type of lines on points	$2, 1^{64}, 0^{1024}$

Singular Points

The surface has 0 singular points:

The 2 Lines

The lines and their Pluecker coordinates are:

$$\ell_0 = \begin{bmatrix} 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{1083424} = \begin{bmatrix} 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}_{1083424} = \mathbf{Pl}(0,1,0,0,0,0)_1$$

$$\ell_1 = \begin{bmatrix} 1 & 1 & 0 & 1 \\ 0 & 0 & 1 & 1 \end{bmatrix}_{35906} = \begin{bmatrix} 1 & 1 & 0 & 1 \\ 0 & 0 & 1 & 1 \end{bmatrix}_{35906} = \mathbf{Pl}(0,1,1,1,1,1)_{70594}$$

Rank of lines: (1083424, 35906)
Rank of points on Klein quadric: (1, 70594)

Eckardt Points

The surface has 0 Eckardt points:

Double Points

The surface has 1 Double points:
The double points on the surface are:

$P_{2082} = (0, 0, 1, 1) = \ell_0 \cap \ell_1$

Single Points

The surface has 64 single points:
The single points on the surface are:

$0: P_2 = (0, 0, 1, 0)$ lies on line ℓ_0
$1: P_3 = (0, 0, 0, 1)$ lies on line ℓ_0
$2: P_{68} = (1, 1, 1, 0)$ lies on line ℓ_1
$3: P_{1091} = (1, 1, 0, 1)$ lies on line ℓ_1
$4: P_{3105} = (0, 0, 2, 1)$ lies on line ℓ_0
$5: P_{3204} = (3, 3, 2, 1)$ lies on line ℓ_1
$6: P_{4129} = (0, 0, 3, 1)$ lies on line ℓ_0
$7: P_{4195} = (2, 2, 3, 1)$ lies on line ℓ_1
$8: P_{5153} = (0, 0, 4, 1)$ lies on line ℓ_0
$9: P_{5318} = (5, 5, 4, 1)$ lies on line ℓ_1
$10: P_{6177} = (0, 0, 5, 1)$ lies on line ℓ_0
$11: P_{6309} = (4, 4, 5, 1)$ lies on line ℓ_1
$12: P_{7201} = (0, 0, 6, 1)$ lies on line ℓ_0
$13: P_{7432} = (7, 7, 6, 1)$ lies on line ℓ_1
$14: P_{8225} = (0, 0, 7, 1)$ lies on line ℓ_0
$15: P_{8423} = (6, 6, 7, 1)$ lies on line ℓ_1
$16: P_{9249} = (0, 0, 8, 1)$ lies on line ℓ_0
$17: P_{9546} = (9, 9, 8, 1)$ lies on line ℓ_1
$18: P_{10273} = (0, 0, 9, 1)$ lies on line ℓ_0
$19: P_{10537} = (8, 8, 9, 1)$ lies on line ℓ_1
$20: P_{11297} = (0, 0, 10, 1)$ lies on line ℓ_0
$21: P_{11660} = (11, 11, 10, 1)$ lies on line ℓ_1
$22: P_{12321} = (0, 0, 11, 1)$ lies on line ℓ_0
$23: P_{12651} = (10, 10, 11, 1)$ lies on line ℓ_1
$24: P_{13345} = (0, 0, 12, 1)$ lies on line ℓ_0
$25: P_{13774} = (13, 13, 12, 1)$ lies on line ℓ_1
$26: P_{14369} = (0, 0, 13, 1)$ lies on line ℓ_0
$27: P_{14765} = (12, 12, 13, 1)$ lies on line ℓ_1
$28: P_{15393} = (0, 0, 14, 1)$ lies on line ℓ_0
$29: P_{15888} = (15, 15, 14, 1)$ lies on line ℓ_1
$30: P_{16417} = (0, 0, 15, 1)$ lies on line ℓ_0
$31: P_{16879} = (14, 14, 15, 1)$ lies on line ℓ_1
$32: P_{17441} = (0, 0, 16, 1)$ lies on line ℓ_0
$33: P_{18002} = (17, 17, 16, 1)$ lies on line ℓ_1
$34: P_{18465} = (0, 0, 17, 1)$ lies on line ℓ_0
$35: P_{18993} = (16, 16, 17, 1)$ lies on line ℓ_1
$36: P_{19489} = (0, 0, 18, 1)$ lies on line ℓ_0
$37: P_{20116} = (19, 19, 18, 1)$ lies on line ℓ_1
$38: P_{20513} = (0, 0, 19, 1)$ lies on line ℓ_0
$39: P_{21107} = (18, 18, 19, 1)$ lies on line ℓ_1
$40: P_{21537} = (0, 0, 20, 1)$ lies on line ℓ_0
$41: P_{22230} = (21, 21, 20, 1)$ lies on line ℓ_1
$42: P_{22561} = (0, 0, 21, 1)$ lies on line ℓ_0
$43: P_{23221} = (20, 20, 21, 1)$ lies on line ℓ_1
$44: P_{23585} = (0, 0, 22, 1)$ lies on line ℓ_0
$45: P_{24344} = (23, 23, 22, 1)$ lies on line ℓ_1
$46: P_{24609} = (0, 0, 23, 1)$ lies on line ℓ_0
$47: P_{25335} = (22, 22, 23, 1)$ lies on line ℓ_1
$48: P_{25633} = (0, 0, 24, 1)$ lies on line ℓ_0
$49: P_{26458} = (25, 25, 24, 1)$ lies on line ℓ_1
$50: P_{26657} = (0, 0, 25, 1)$ lies on line ℓ_0
$51: P_{27449} = (24, 24, 25, 1)$ lies on line ℓ_1
$52: P_{27681} = (0, 0, 26, 1)$ lies on line ℓ_0
$53: P_{28572} = (27, 27, 26, 1)$ lies on line ℓ_1
$54: P_{28705} = (0, 0, 27, 1)$ lies on line ℓ_0
$55: P_{29563} = (26, 26, 27, 1)$ lies on line ℓ_1
$56: P_{29729} = (0, 0, 28, 1)$ lies on line ℓ_0
$57: P_{30686} = (29, 29, 28, 1)$ lies on line ℓ_1
$58: P_{30753} = (0, 0, 29, 1)$ lies on line ℓ_0
$59: P_{31677} = (28, 28, 29, 1)$ lies on line ℓ_1
$60: P_{31777} = (0, 0, 30, 1)$ lies on line ℓ_0
$61: P_{32800} = (31, 31, 30, 1)$ lies on line ℓ_1
$62: P_{32801} = (0, 0, 31, 1)$ lies on line ℓ_0
$63: P_{33791} = (30, 30, 31, 1)$ lies on line ℓ_1

The single points on the surface are:

Points on surface but on no line

The surface has 1024 points not on any line:
Too many to print.

Line Intersection Graph

	0	1
0	0	1
1	1	0

Neighbor sets in the line intersection graph:
Line 0 intersects

Line	ℓ_1
in point	P_{2082}

Line 1 intersects

Line	ℓ_0
in point	P_{2082}

The surface has 1089 points:
Too many to print.