Rank-76 over GF(32)

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The equation

The equation of the surface is :

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

(0, 1, 1, 1, 1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0)
The point rank of the equation over GF(32) is 2164816

General information

Number of lines	1
Number of points	1057
Number of singular points	1
Number of Eckardt points	0
Number of double points	0
Number of single points	33
Number of points off lines	1024
Number of Hesse planes	0
Number of axes	0
Type of points on lines	33
Type of lines on points	1^{33}, 0^{1024}

Singular Points

The surface has 1 singular points:

$0: \ P_{68} = \mathbf{P}(1,1,1,0) = \mathbf{P}(1,1,1,0)$

The 1 Lines

The lines and their Pluecker coordinates are:

$$\ell_0 = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 1 & 0 \end{bmatrix}_1 = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 1 & 0 \end{bmatrix}_1 = \mathbf{Pl}(1,0,1,0,0,0)_3$$

Rank of lines: (1)
Rank of points on Klein quadric: (3)

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 33 single points:
The single points on the surface are:

$0: P_0 = (1,0,0,0)$ lies on line ℓ_0
$1: P_{67} = (0,1,1,0)$ lies on line ℓ_0
$2: P_{68} = (1,1,1,0)$ lies on line ℓ_0
$3: P_{69} = (2,1,1,0)$ lies on line ℓ_0
$4: P_{70} = (3,1,1,0)$ lies on line ℓ_0
$5: P_{71} = (4,1,1,0)$ lies on line ℓ_0
$6: P_{72} = (5,1,1,0)$ lies on line ℓ_0
$7: P_{73} = (6,1,1,0)$ lies on line ℓ_0
$8: P_{74} = (7,1,1,0)$ lies on line ℓ_0
$9: P_{75} = (8,1,1,0)$ lies on line ℓ_0
$10: P_{76} = (9,1,1,0)$ lies on line ℓ_0
$11: P_{77} = (10,1,1,0)$ lies on line ℓ_0
$12: P_{78} = (11,1,1,0)$ lies on line ℓ_0
$13: P_{79} = (12,1,1,0)$ lies on line ℓ_0
$14: P_{80} = (13,1,1,0)$ lies on line ℓ_0
$15: P_{81} = (14,1,1,0)$ lies on line ℓ_0
$16: P_{82} = (15,1,1,0)$ lies on line ℓ_0
$17: P_{83} = (16,1,1,0)$ lies on line ℓ_0
$18: P_{84} = (17,1,1,0)$ lies on line ℓ_0
$19: P_{85} = (18,1,1,0)$ lies on line ℓ_0
$20: P_{86} = (19,1,1,0)$ lies on line ℓ_0
$21: P_{87} = (20,1,1,0)$ lies on line ℓ_0
$22: P_{88} = (21,1,1,0)$ lies on line ℓ_0
$23: P_{89} = (22,1,1,0)$ lies on line ℓ_0
$24: P_{90} = (23,1,1,0)$ lies on line ℓ_0
$25: P_{91} = (24,1,1,0)$ lies on line ℓ_0
$26: P_{92} = (25,1,1,0)$ lies on line ℓ_0
$27: P_{93} = (26,1,1,0)$ lies on line ℓ_0
$28: P_{94} = (27,1,1,0)$ lies on line ℓ_0
$29: P_{95} = (28,1,1,0)$ lies on line ℓ_0
$30: P_{96} = (29,1,1,0)$ lies on line ℓ_0
$31: P_{97} = (30,1,1,0)$ lies on line ℓ_0
$32: P_{98} = (31,1,1,0)$ lies on line ℓ_0

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

Neighbor sets in the line intersection graph:
Line 0 intersects

Line
in point

The surface has 1057 points:
Too many to print.