Rank-65612 over GF(4)

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The equation

The equation of the surface is :

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

(1, 0, 0, 1, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0)
The point rank of the equation over GF(4) is 1431659930

General information

Number of lines	1
Number of points	17
Number of singular points	2
Number of Eckardt points	0
Number of double points	0
Number of single points	5
Number of points off lines	12
Number of Hesse planes	0
Number of axes	0
Type of points on lines	5
Type of lines on points	1^5, 0^{12}

Singular Points

The surface has 2 singular points:

$0: \ P_1 = \mathbf{P}(0,1,0,0) = \mathbf{P}(0,1,0,0)$
$1: \ P_2 = \mathbf{P}(0,0,1,0) = \mathbf{P}(0,0,1,0)$

The 1 Lines

The lines and their Pluecker coordinates are:

$$\ell_0 = \left[\begin{array}{cccc} 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \end{array}\right]_{336} = \left[\begin{array}{cccc} 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \end{array}\right]_{336} = \mathbf{Pl}(0,0,0,0,0,1)_{101}$$

Rank of lines: (336)
Rank of points on Klein quadric: (101)

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

0 : $P_1 = (0,1,0,0)$ lies on line ℓ_0
1 : $P_2 = (0,0,1,0)$ lies on line ℓ_0
2 : $P_{11} = (0,1,1,0)$ lies on line ℓ_0
3 : $P_{15} = (0,2,1,0)$ lies on line ℓ_0
4 : $P_{19} = (0,3,1,0)$ lies on line ℓ_0

The single points on the surface are:

Points on surface but on no line

The surface has 12 points not on any line:
The points on the surface but not on lines are:

0 : $P_4 = (1,1,1,1)$
1 : $P_{12} = (1,1,1,0)$
2 : $P_{18} = (3,2,1,0)$
3 : $P_{21} = (2,3,1,0)$
4 : $P_{47} = (2,2,1,1)$
5 : $P_{52} = (3,3,1,1)$
6 : $P_{59} = (2,1,2,1)$
7 : $P_{64} = (3,2,2,1)$
8 : $P_{66} = (1,3,2,1)$
9 : $P_{76} = (3,1,3,1)$
10 : $P_{78} = (1,2,3,1)$
11 : $P_{83} = (2,3,3,1)$

Line Intersection Graph

	0
0	0

Neighbor sets in the line intersection graph:
Line 0 intersects

Line
in point

The surface has 17 points:
The points on the surface are:

$0:\ P_1 = (0,1,0,0)$
$1:\ P_2 = (0,0,1,0)$
$2:\ P_4 = (1,1,1,1)$
$3:\ P_{11} = (0,1,1,0)$
$4:\ P_{12} = (1,1,1,0)$
$5:\ P_{15} = (0,2,1,0)$
$6:\ P_{18} = (3,2,1,0)$
$7:\ P_{19} = (0,3,1,0)$
$8:\ P_{21} = (2,3,1,0)$
$9:\ P_{47} = (2,2,1,1)$
$10:\ P_{52} = (3,3,1,1)$
$11:\ P_{59} = (2,1,2,1)$
$12:\ P_{64} = (3,2,2,1)$
$13:\ P_{66} = (1,3,2,1)$
$14:\ P_{76} = (3,1,3,1)$
$15:\ P_{78} = (1,2,3,1)$
$16:\ P_{83} = (2,3,3,1)$