Rank-74248 over GF(4)

January 15, 2021

The equation

The equation of the surface is :

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

(1, 0, 1, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 1, 0, 0, 1, 0, 0, 0)
The point rank of the equation over GF(4) is 1499026794

General information

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

Singular Points

The surface has 1 singular points:

$0 : P_{23} = \mathbf{P}(1,0,0,1) = \mathbf{P}(1,0,0,1)$

The 0 Lines

The lines and their Pluecker coordinates are:
Rank of lines: ( )
Rank of points on Klein quadric: ( )

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

The single points on the surface are:

Points on surface but on no line

The surface has 17 points not on any line:
The points on the surface but not on lines are:

$0: P_1 = (0, 1, 0, 0)$

$1: P_3 = (0, 0, 0, 1)$

$2: P_8 = (1, 0, 1, 0)$

$3: P_9 = (2, 0, 1, 0)$

$4: P_{10} = (3, 0, 1, 0)$

$5: P_{23} = (1, 0, 0, 1)$

$6: P_{32} = (2, 2, 0, 1)$

$7: P_{37} = (3, 3, 0, 1)$

$8: P_{42} = (0, 1, 1, 1)$

$9: P_{46} = (1, 2, 1, 1)$

$10: P_{50} = (1, 3, 1, 1)$

$11: P_{57} = (0, 1, 2, 1)$

$12: P_{59} = (2, 1, 2, 1)$

$13: P_{63} = (2, 2, 2, 1)$

$14: P_{73} = (0, 1, 3, 1)$

$15: P_{76} = (3, 1, 3, 1)$

$16: P_{84} = (3, 3, 3, 1)$

Line Intersection Graph

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Neighbor sets in the line intersection graph:
The surface has 17 points:
The points on the surface are:

$0: P_1 = (0, 1, 0, 0)$

$1: P_3 = (0, 0, 0, 1)$

$2: P_8 = (1, 0, 1, 0)$

$3: P_9 = (2, 0, 1, 0)$

$4: P_{10} = (3, 0, 1, 0)$

$5: P_{23} = (1, 0, 0, 1)$

$6: P_{32} = (2, 2, 0, 1)$

$7: P_{37} = (3, 3, 0, 1)$

$8: P_{42} = (0, 1, 1, 1)$

$9: P_{46} = (1, 2, 1, 1)$

$10: P_{50} = (1, 3, 1, 1)$

$11: P_{57} = (0, 1, 2, 1)$

$12: P_{59} = (2, 1, 2, 1)$

$13: P_{63} = (2, 2, 2, 1)$

$14: P_{73} = (0, 1, 3, 1)$

$15: P_{76} = (3, 1, 3, 1)$

$16: P_{84} = (3, 3, 3, 1)$