

# Rank-65868 over GF(4)

January 15, 2021

## The equation

The equation of the surface is :

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

( 1, 0, 0, 1, 0, 0, 1, 0, 1, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0 )

The point rank of the equation over GF(4) is 1431725466

## General information

Number of lines	0
Number of points	13
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	13
Number of Hesse planes	0
Number of axes	0
Type of points on lines	
Type of lines on points	$0^{13}$

## Singular Points

The surface has 1 singular points:

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

## 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 13 points not on any line:

The points on the surface but not on lines are:

0 : $P_1 = (0, 1, 0, 0)$	7 : $P_{46} = (1, 2, 1, 1)$
1 : $P_2 = (0, 0, 1, 0)$	8 : $P_{48} = (3, 2, 1, 1)$
2 : $P_{16} = (1, 2, 1, 0)$	9 : $P_{50} = (1, 3, 1, 1)$
3 : $P_{20} = (1, 3, 1, 0)$	10 : $P_{51} = (2, 3, 1, 1)$
4 : $P_{42} = (0, 1, 1, 1)$	11 : $P_{61} = (0, 2, 2, 1)$
5 : $P_{43} = (2, 1, 1, 1)$	12 : $P_{81} = (0, 3, 3, 1)$
6 : $P_{44} = (3, 1, 1, 1)$	

### Line Intersection Graph

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Neighbor sets in the line intersection graph:

The surface has 13 points:

The points on the surface are:

0 : $P_1 = (0, 1, 0, 0)$	5 : $P_{43} = (2, 1, 1, 1)$	10 : $P_{51} = (2, 3, 1, 1)$
1 : $P_2 = (0, 0, 1, 0)$	6 : $P_{44} = (3, 1, 1, 1)$	11 : $P_{61} = (0, 2, 2, 1)$
2 : $P_{16} = (1, 2, 1, 0)$	7 : $P_{46} = (1, 2, 1, 1)$	12 : $P_{81} = (0, 3, 3, 1)$
3 : $P_{20} = (1, 3, 1, 0)$	8 : $P_{48} = (3, 2, 1, 1)$	
4 : $P_{42} = (0, 1, 1, 1)$	9 : $P_{50} = (1, 3, 1, 1)$	