

Rank-76356 over GF(32)

January 15, 2021

The equation

The equation of the surface is :

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

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

The point rank of the equation over GF(32) is -2112846810

General information

Number of lines	1
Number of points	1057
Number of singular points	0
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 0 singular points:

The 1 Lines

The lines and their Pluecker coordinates are:

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

Rank of lines: (1083424)

Rank of points on Klein quadric: (1)

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 : $P_2 = (0, 0, 1, 0)$ lies on line ℓ_0 | 17 : $P_{17441} = (0, 0, 16, 1)$ lies on line ℓ_0 |
| 1 : $P_3 = (0, 0, 0, 1)$ lies on line ℓ_0 | 18 : $P_{18465} = (0, 0, 17, 1)$ lies on line ℓ_0 |
| 2 : $P_{2082} = (0, 0, 1, 1)$ lies on line ℓ_0 | 19 : $P_{19489} = (0, 0, 18, 1)$ lies on line ℓ_0 |
| 3 : $P_{3105} = (0, 0, 2, 1)$ lies on line ℓ_0 | 20 : $P_{20513} = (0, 0, 19, 1)$ lies on line ℓ_0 |
| 4 : $P_{4129} = (0, 0, 3, 1)$ lies on line ℓ_0 | 21 : $P_{21537} = (0, 0, 20, 1)$ lies on line ℓ_0 |
| 5 : $P_{5153} = (0, 0, 4, 1)$ lies on line ℓ_0 | 22 : $P_{22561} = (0, 0, 21, 1)$ lies on line ℓ_0 |
| 6 : $P_{6177} = (0, 0, 5, 1)$ lies on line ℓ_0 | 23 : $P_{23585} = (0, 0, 22, 1)$ lies on line ℓ_0 |
| 7 : $P_{7201} = (0, 0, 6, 1)$ lies on line ℓ_0 | 24 : $P_{24609} = (0, 0, 23, 1)$ lies on line ℓ_0 |
| 8 : $P_{8225} = (0, 0, 7, 1)$ lies on line ℓ_0 | 25 : $P_{25633} = (0, 0, 24, 1)$ lies on line ℓ_0 |
| 9 : $P_{9249} = (0, 0, 8, 1)$ lies on line ℓ_0 | 26 : $P_{26657} = (0, 0, 25, 1)$ lies on line ℓ_0 |
| 10 : $P_{10273} = (0, 0, 9, 1)$ lies on line ℓ_0 | 27 : $P_{27681} = (0, 0, 26, 1)$ lies on line ℓ_0 |
| 11 : $P_{11297} = (0, 0, 10, 1)$ lies on line ℓ_0 | 28 : $P_{28705} = (0, 0, 27, 1)$ lies on line ℓ_0 |
| 12 : $P_{12321} = (0, 0, 11, 1)$ lies on line ℓ_0 | 29 : $P_{29729} = (0, 0, 28, 1)$ lies on line ℓ_0 |
| 13 : $P_{13345} = (0, 0, 12, 1)$ lies on line ℓ_0 | 30 : $P_{30753} = (0, 0, 29, 1)$ lies on line ℓ_0 |
| 14 : $P_{14369} = (0, 0, 13, 1)$ lies on line ℓ_0 | 31 : $P_{31777} = (0, 0, 30, 1)$ lies on line ℓ_0 |
| 15 : $P_{15393} = (0, 0, 14, 1)$ lies on line ℓ_0 | 32 : $P_{32801} = (0, 0, 31, 1)$ lies on line ℓ_0 |
| 16 : $P_{16417} = (0, 0, 15, 1)$ 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

$$\begin{array}{c|c} & 0 \\ \hline 0 & 0 \end{array}$$

Neighbor sets in the line intersection graph:

Line 0 intersects

Line
in point

The surface has 1057 points:

Too many to print.