Rank-65874 over GF(32)

January 15, 2021

The equation

The equation of the surface is :

$$X_0^3 + X_1^3 + X_2^3 + X_3^3 + X_0^2X_3 + X_1^2X_2 + X_0X_1X_2 = 0$$

(1, 1, 1, 1, 0, 0, 1, 0, 1, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0)
The point rank of the equation over GF(32) is -2112812986

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:

$$\ell_0 = \begin{bmatrix} 1 & 0 & 1 & 1 \\ 0 & 1 & 1 & 1 \end{bmatrix}_{34914} = \begin{bmatrix} 1 & 0 & 1 & 1 \\ 0 & 1 & 1 & 1 \end{bmatrix}_{34914} = \mathbf{Pl}(1,0,1,1,1,1)_{70563}$$

Rank of lines: (34914)
Rank of points on Klein quadric: (70563)

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:

$0: P_5 = (1,1,0,0)$ lies on line ℓ_0
$1: P_{2083} = (1,0,1,1)$ lies on line ℓ_0
$2: P_{2114} = (0,1,1,1)$ lies on line ℓ_0
$3: P_{2148} = (3,2,1,1)$ lies on line ℓ_0
$4: P_{2179} = (2,3,1,1)$ lies on line ℓ_0
$5: P_{2214} = (5,4,1,1)$ lies on line ℓ_0
$6: P_{2245} = (4,5,1,1)$ lies on line ℓ_0
$7: P_{2280} = (7,6,1,1)$ lies on line ℓ_0
$8: P_{2311} = (6,7,1,1)$ lies on line ℓ_0
$9: P_{2346} = (9,8,1,1)$ lies on line ℓ_0
$10: P_{2377} = (8,9,1,1)$ lies on line ℓ_0
$11: P_{2412} = (11,10,1,1)$ lies on line ℓ_0
$12: P_{2443} = (10,11,1,1)$ lies on line ℓ_0
$13: P_{2478} = (13,12,1,1)$ lies on line ℓ_0
$14: P_{2509} = (12,13,1,1)$ lies on line ℓ_0
$15: P_{2544} = (15,14,1,1)$ lies on line ℓ_0
$16: P_{2575} = (14,15,1,1)$ lies on line ℓ_0
$17: P_{2610} = (17,16,1,1)$ lies on line ℓ_0
$18: P_{2641} = (16,17,1,1)$ lies on line ℓ_0
$19: P_{2676} = (19,18,1,1)$ lies on line ℓ_0
$20: P_{2707} = (18,19,1,1)$ lies on line ℓ_0
$21: P_{2742} = (21,20,1,1)$ lies on line ℓ_0
$22: P_{2773} = (20,21,1,1)$ lies on line ℓ_0
$23: P_{2808} = (23,22,1,1)$ lies on line ℓ_0
$24: P_{2839} = (22,23,1,1)$ lies on line ℓ_0
$25: P_{2874} = (25,24,1,1)$ lies on line ℓ_0
$26: P_{2905} = (24,25,1,1)$ lies on line ℓ_0
$27: P_{2940} = (27,26,1,1)$ lies on line ℓ_0
$28: P_{2971} = (26,27,1,1)$ lies on line ℓ_0
$29: P_{3006} = (29,28,1,1)$ lies on line ℓ_0
$30: P_{3037} = (28,29,1,1)$ lies on line ℓ_0
$31: P_{3072} = (31,30,1,1)$ lies on line ℓ_0
$32: P_{3103} = (30,31,1,1)$ 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

	0
0	0

Neighbor sets in the line intersection graph:
Line 0 intersects

Line
in point

The surface has 1057 points:
Too many to print.