Rank-76 over GF(64)

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The equation

The equation of the surface is :

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

(0, 1, 1, 1, 1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0)
The point rank of the equation over GF(64) is 34087056

General information

Number of lines	1
Number of points	4161
Number of singular points	1
Number of Eckardt points	0
Number of double points	0
Number of single points	65
Number of points off lines	4096
Number of Hesse planes	0
Number of axes	0
Type of points on lines	65
Type of lines on points	1^{65}, 0^{4096}

Singular Points

The surface has 1 singular points:

$0: \ P_{132} = \mathbf{P}(1,1,1,0) = \mathbf{P}(1,1,1,0)$

The 1 Lines

The lines and their Pluecker coordinates are:

$$\ell_0 = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 1 & 0 \end{bmatrix}_1 = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 1 & 0 \end{bmatrix}_1 = \mathbf{Pl}(1,0,1,0,0,0)_3$$

Rank of lines: (1)
Rank of points on Klein quadric: (3)

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

$0: P_0 = (1,0,0,0)$ lies on line ℓ_0
$1: P_{131} = (0,1,1,0)$ lies on line ℓ_0
$2: P_{132} = (1,1,1,0)$ lies on line ℓ_0
$3: P_{133} = (2,1,1,0)$ lies on line ℓ_0
$4: P_{134} = (3,1,1,0)$ lies on line ℓ_0
$5: P_{135} = (4,1,1,0)$ lies on line ℓ_0
$6: P_{136} = (5,1,1,0)$ lies on line ℓ_0
$7: P_{137} = (6,1,1,0)$ lies on line ℓ_0
$8: P_{138} = (7,1,1,0)$ lies on line ℓ_0
$9: P_{139} = (8,1,1,0)$ lies on line ℓ_0
$10: P_{140} = (9,1,1,0)$ lies on line ℓ_0
$11: P_{141} = (10,1,1,0)$ lies on line ℓ_0
$12: P_{142} = (11,1,1,0)$ lies on line ℓ_0
$13: P_{143} = (12,1,1,0)$ lies on line ℓ_0
$14: P_{144} = (13,1,1,0)$ lies on line ℓ_0
$15: P_{145} = (14,1,1,0)$ lies on line ℓ_0
$16: P_{146} = (15,1,1,0)$ lies on line ℓ_0
$17: P_{147} = (16,1,1,0)$ lies on line ℓ_0
$18: P_{148} = (17,1,1,0)$ lies on line ℓ_0
$19: P_{149} = (18,1,1,0)$ lies on line ℓ_0
$20: P_{150} = (19,1,1,0)$ lies on line ℓ_0
$21: P_{151} = (20,1,1,0)$ lies on line ℓ_0
$22: P_{152} = (21,1,1,0)$ lies on line ℓ_0
$23: P_{153} = (22,1,1,0)$ lies on line ℓ_0
$24: P_{154} = (23,1,1,0)$ lies on line ℓ_0
$25: P_{155} = (24,1,1,0)$ lies on line ℓ_0
$26: P_{156} = (25,1,1,0)$ lies on line ℓ_0
$27: P_{157} = (26,1,1,0)$ lies on line ℓ_0
$28: P_{158} = (27,1,1,0)$ lies on line ℓ_0
$29: P_{159} = (28,1,1,0)$ lies on line ℓ_0
$30: P_{160} = (29,1,1,0)$ lies on line ℓ_0
$31: P_{161} = (30,1,1,0)$ lies on line ℓ_0
$32: P_{162} = (31,1,1,0)$ lies on line ℓ_0
$33: P_{163} = (32,1,1,0)$ lies on line ℓ_0
$34: P_{164} = (33,1,1,0)$ lies on line ℓ_0
$35: P_{165} = (34,1,1,0)$ lies on line ℓ_0
$36: P_{166} = (35,1,1,0)$ lies on line ℓ_0
$37: P_{167} = (36,1,1,0)$ lies on line ℓ_0
$38: P_{168} = (37,1,1,0)$ lies on line ℓ_0
$39: P_{169} = (38,1,1,0)$ lies on line ℓ_0
$40: P_{170} = (39,1,1,0)$ lies on line ℓ_0
$41: P_{171} = (40,1,1,0)$ lies on line ℓ_0
$42: P_{172} = (41,1,1,0)$ lies on line ℓ_0
$43: P_{173} = (42,1,1,0)$ lies on line ℓ_0
$44: P_{174} = (43,1,1,0)$ lies on line ℓ_0
$45: P_{175} = (44,1,1,0)$ lies on line ℓ_0
$46: P_{176} = (45,1,1,0)$ lies on line ℓ_0
$47: P_{177} = (46,1,1,0)$ lies on line ℓ_0
$48: P_{178} = (47,1,1,0)$ lies on line ℓ_0
$49: P_{179} = (48,1,1,0)$ lies on line ℓ_0
$50: P_{180} = (49,1,1,0)$ lies on line ℓ_0
$51: P_{181} = (50,1,1,0)$ lies on line ℓ_0
$52: P_{182} = (51,1,1,0)$ lies on line ℓ_0
$53: P_{183} = (52,1,1,0)$ lies on line ℓ_0
$54: P_{184} = (53,1,1,0)$ lies on line ℓ_0
$55: P_{185} = (54,1,1,0)$ lies on line ℓ_0
$56: P_{186} = (55,1,1,0)$ lies on line ℓ_0
$57: P_{187} = (56,1,1,0)$ lies on line ℓ_0
$58: P_{188} = (57,1,1,0)$ lies on line ℓ_0
$59: P_{189} = (58,1,1,0)$ lies on line ℓ_0
$60: P_{190} = (59,1,1,0)$ lies on line ℓ_0
$61: P_{191} = (60,1,1,0)$ lies on line ℓ_0
$62: P_{192} = (61,1,1,0)$ lies on line ℓ_0
$63: P_{193} = (62,1,1,0)$ lies on line ℓ_0
$64: P_{194} = (63,1,1,0)$ lies on line ℓ_0

The single points on the surface are:

Points on surface but on no line

The surface has 4096 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 4161 points:
Too many to print.