1 BLT set 4 over GF(27)

Points on the quadric $x_0^2 + x_1x_2 + x_3x_4$:

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

$P_2 = (0, 0, 1, 0, 0)$

$P_3 = (0, 1, 1, 2, 1)$

$P_4 = (0, 1, 1, 1, 2)$

$P_5 = (0, 1, 9, 10, 22)$

$P_6 = (0, 1, 9, 20, 17)$

$P_7 = (0, 1, 20, 13, 18)$

$P_8 = (0, 1, 20, 26, 9)$

$P_9 = (0, 1, 11, 4, 7)$

$P_{10} = (0, 1, 11, 8, 5)$

$P_{11} = (1, 17, 26, 10, 23)$

$P_{12} = (1, 22, 13, 10, 23)$

$P_{13} = (1, 18, 26, 6, 6)$

$P_{14} = (1, 9, 13, 6, 6)$

$P_{15} = (1, 15, 13, 17, 11)$

$P_{16} = (1, 21, 26, 17, 11)$

$P_{17} = (1, 17, 26, 4, 21)$

$P_{18} = (1, 22, 13, 4, 21)$

$P_{19} = (1, 6, 13, 25, 22)$

$P_{20} = (1, 3, 26, 25, 22)$

$P_{21} = (1, 14, 26, 18, 7)$

$P_{22} = (1, 25, 13, 18, 7)$

$P_{23} = (1, 23, 26, 12, 8)$

$P_{24} = (1, 16, 13, 12, 8)$

$P_{25} = (1, 13, 13, 2, 9)$

$P_{26} = (1, 26, 26, 2, 9)$

$P_{27} = (1, 17, 26, 23, 10)$

$P_{28} = (1, 22, 13, 23, 10)$

Stabilizer of order 648 is generated by:

$$g_1 = \begin{pmatrix} 2 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 2 & 0 \\ 0 & 0 & 0 & 0 & 2 \end{pmatrix}, 0$$

$$g_2 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 15 & 0 & 0 & 0 \\ 0 & 15 & 8 & 14 & 9 \\ 0 & 21 & 0 & 25 & 0 \\ 0 & 15 & 0 & 0 & 9 \end{pmatrix}, 1$$

$$g_3 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 15 & 0 & 0 & 0 \\ 0 & 0 & 8 & 0 & 0 \\ 0 & 0 & 0 & 25 & 0 \\ 0 & 0 & 0 & 0 & 9 \end{pmatrix}, 1$$

$$g_4 = \begin{pmatrix} 15 & 0 & 0 & 15 & 20 \\ 0 & 21 & 0 & 0 & 0 \\ 0 & 0 & 4 & 0 & 0 \\ 26 & 0 & 0 & 7 & 4 \\ 26 & 0 & 0 & 23 & 22 \end{pmatrix}, 1$$

Induced action on the BLT-set:

The induced group has order 648 and is generated by:

g_1 =(3, 4)(5, 6)(7, 8)(9, 10)(11, 12)(13, 14)(15, 16)(17, 18)(19, 20)(21, 22)(23, 24)(25, 26)(27, 28)

g_2 =(2, 5, 4)(3, 6, 10)(7, 9, 8)(11, 17, 21)(12, 24, 15)(13, 27, 23)(14, 18, 25)(16, 26, 20)

g_3 =(3, 5, 8)(4, 6, 7)(11, 27, 17)(12, 28, 18)(13, 23, 20)(14, 24, 19)(15, 22, 25)(16, 21, 26)

g_4 =(3, 5, 21, 4, 6, 22)(7, 26, 16, 8, 25, 15)(9, 11, 18, 10, 12, 17)(13, 24, 19, 14, 23, 20)(27, 28)

Kernel has order 1 and is generated by:

There are 2 orbits on the BLT set.

The orbit length are $[27, 1]$

The orbits are:

$O_0 = \{1\}$ (length 1)

$O_1 = \{2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28\}$ (length 27)

The actions induced on the orbits are:

Induced action on orbit $O_0 = \{1\}$ (length 1)

The induced group has order 1 and is generated by:

g_1 =id

g_2 =id

g_3 =id

g_4 =id

Kernel has order 648 and is generated by:

$$b_1 = \begin{pmatrix} 11 & 10 & 0 & 16 & 16 \\ 0 & 6 & 0 & 0 & 0 \\ 0 & 6 & 11 & 26 & 22 \\ 14 & 12 & 0 & 20 & 3 \\ 19 & 10 & 0 & 18 & 8 \end{pmatrix}, 2$$

$$b_2 = \begin{pmatrix} 15 & 0 & 0 & 15 & 20 \\ 0 & 15 & 0 & 0 & 0 \\ 0 & 0 & 8 & 0 & 0 \\ 26 & 0 & 0 & 7 & 4 \\ 26 & 0 & 0 & 23 & 22 \end{pmatrix}, 1$$

$$b_3 = \begin{pmatrix} 15 & 20 & 0 & 11 & 1 \\ 0 & 6 & 0 & 0 & 0 \\ 17 & 6 & 11 & 1 & 5 \\ 26 & 24 & 0 & 25 & 3 \\ 26 & 20 & 0 & 2 & 11 \end{pmatrix}, 2$$

$$b_4 = \begin{pmatrix} 2 & 0 & 0 & 0 & 0 \\ 0 & 3 & 0 & 0 & 0 \\ 0 & 0 & 19 & 0 & 0 \\ 0 & 0 & 0 & 26 & 0 \\ 0 & 0 & 0 & 0 & 17 \end{pmatrix}, 2$$

$$b_5 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 21 & 0 & 0 & 0 \\ 0 & 0 & 4 & 0 & 0 \\ 0 & 0 & 0 & 25 & 0 \\ 0 & 0 & 0 & 0 & 9 \end{pmatrix}, 1$$

The kernel has 51 orbits on the quadric.

The orbit length are $[648^{20}, 324^{17}, 216^4, 162^4, 108^4, 27, 1]$

Induced action on orbit $O_1 = \{2, 135, 136, 176, 183, 645, 650, 773, 779, 5507, 5512, 7093, 7098, 9407, 9412, 10473, 1$

(length 27)

The induced group has order 648 and is generated by:

g_1 =(1, 7, 27)(2, 16, 15)(3, 23, 19)(4, 9, 14)(6, 24, 26)(8, 21, 18)(10, 20, 17)(12, 25, 13)

g_2 =(2, 5, 18)(3, 4, 19)(6, 27, 12)(7, 26, 13)(8, 15, 11)(9, 14, 10)(16, 22, 21)(17, 23, 20)

g_3 =(1, 18, 26)(2, 22, 6)(3, 16, 25)(4, 5, 15)(7, 11, 20)(9, 21, 17)(10, 24, 13)(14, 27, 19)

g_4 =(2, 7, 4)(3, 6, 5)(10, 24, 14)(11, 25, 15)(12, 26, 18)(13, 27, 19)(16, 20, 22)(17, 21, 23)

g_5 =(2, 5, 7, 3, 4, 6)(8, 9)(10, 15, 24, 11, 14, 25)(12, 19, 26, 13, 18, 27)(16, 23, 20, 17, 22, 21)

Kernel has order 1 and is generated by:

Induced action on orbit $O_1 = \{2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27$

(length 27)

The induced group has order 648 and is generated by:

g_1 =(2, 3)(4, 5)(6, 7)(8, 9)(10, 11)(12, 13)(14, 15)(16, 17)(18, 19)(20, 21)(22, 23)(24, 25)(26, 27)

g_2 =(1, 4, 3)(2, 5, 9)(6, 8, 7)(10, 16, 20)(11, 23, 14)(12, 26, 22)(13, 17, 24)(15, 25, 19)

g_3 =(2, 4, 7)(3, 5, 6)(10, 26, 16)(11, 27, 17)(12, 22, 19)(13, 23, 18)(14, 21, 24)(15, 20, 25)

g_4 =(2, 4, 20, 3, 5, 21)(6, 25, 15, 7, 24, 14)(8, 10, 17, 9, 11, 16)(12, 23, 18, 13, 22, 19)(26, 27)

Kernel has order 1 and is generated by: