1 BLT set 5 over GF(25)

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

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

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

$P_3 = (0, 1, 17, 4, 17)$

$P_4 = (0, 1, 13, 2, 21)$

$P_5 = (0, 1, 21, 12, 20)$

$P_6 = (1, 19, 15, 23, 17)$

$P_7 = (1, 19, 16, 10, 15)$

$P_8 = (1, 22, 21, 7, 2)$

$P_9 = (1, 2, 9, 8, 10)$

$P_{10} = (1, 20, 8, 21, 16)$

$P_{11} = (0, 1, 7, 16, 3)$

$P_{12} = (1, 8, 10, 15, 12)$

$P_{13} = (0, 1, 7, 15, 11)$

$P_{14} = (1, 19, 14, 22, 13)$

$P_{15} = (0, 1, 14, 23, 2)$

$P_{16} = (1, 7, 22, 5, 5)$

$P_{17} = (1, 8, 5, 18, 2)$

$P_{18} = (1, 1, 14, 8, 9)$

$P_{19} = (1, 4, 7, 4, 24)$

$P_{20} = (1, 15, 12, 9, 18)$

$P_{21} = (1, 10, 2, 19, 14)$

$P_{22} = (1, 23, 18, 17, 24)$

$P_{23} = (1, 6, 23, 23, 10)$

$P_{24} = (1, 11, 16, 21, 11)$

$P_{25} = (1, 18, 20, 7, 17)$

$P_{26} = (1, 15, 3, 24, 10)$

Stabilizer of order 16 is generated by:

$$g_1 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 4 & 0 & 0 & 0 \\ 0 & 20 & 4 & 15 & 3 \\ 0 & 3 & 0 & 1 & 0 \\ 0 & 15 & 0 & 0 & 1 \end{pmatrix}, 0$$

with 28 fixed points

$$g_2 = \begin{pmatrix} 3 & 24 & 0 & 14 & 16 \\ 0 & 13 & 2 & 17 & 2 \\ 19 & 1 & 15 & 17 & 23 \\ 7 & 7 & 2 & 19 & 1 \\ 23 & 10 & 10 & 3 & 12 \end{pmatrix}, 1$$

with 156 fixed points

$$g_3 = \begin{pmatrix} 3 & 24 & 0 & 14 & 16 \\ 0 & 16 & 0 & 0 & 0 \\ 15 & 3 & 7 & 11 & 23 \\ 11 & 24 & 0 & 9 & 17 \\ 24 & 15 & 0 & 5 & 10 \end{pmatrix}, 1$$

with 2 fixed points The induced group has order 16 and is generated by:

g_1 =(1)(3)(7, 14)(6, 12)(19, 23)(8, 9)(11, 13)(10, 16)(17, 25)(18, 24)(5, 15)(20, 22)(21, 26)(2, 4)

g_2 =(2, 6)(4, 12)(5, 18)(7, 26)(8, 17)(9, 25)(10, 19)(11, 20)(13, 22)(14, 21)(15, 24)(16, 23)(1, 3)

g_3 =(1)(3)(5, 24, 16, 23, 15, 18, 10, 19)(6, 17, 26, 13, 12, 25, 21, 11)(2, 20, 14, 9, 4, 22, 7, 8)

Kernel has order 1 and is generated by:

There are 3 orbits on the BLT set.

The orbit length are $[16, 8, 2]$

The orbits are:

$O_0 = \{1, 3\}$ (length 2)

$O_1 = \{2, 4, 6, 7, 8, 9, 11, 12, 13, 14, 17, 20, 21, 22, 25, 26\}$ (length 16)

$O_2 = \{5, 10, 15, 16, 18, 19, 23, 24\}$ (length 8)

The actions induced on the orbits are:

Induced action on orbit $O_0 = \{1, 3\}$ (length 2)

The induced group has order 2 and is generated by:

g_1 =(2)(1)

g_2 =(1, 2)

g_3 =(2)(1)

group order is small, so we list all elements

a_1 =(2)(1)

a_2 =(2)(1)

and now the elements themselves: $a_1 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{pmatrix}$, 0 with 26 fixed points

$a_2 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 4 & 0 & 0 & 0 \\ 0 & 20 & 4 & 15 & 3 \\ 0 & 3 & 0 & 1 & 0 \\ 0 & 15 & 0 & 0 & 1 \end{pmatrix}$, 0 with 2 fixed points

Kernel has order 8 and is generated by:

$$b_1 = \begin{pmatrix} 11 & 23 & 0 & 14 & 8 \\ 0 & 2 & 0 & 0 & 0 \\ 14 & 9 & 3 & 17 & 19 \\ 19 & 18 & 0 & 24 & 3 \\ 7 & 12 & 0 & 11 & 24 \end{pmatrix}, 0$$

$$b_2 = \begin{pmatrix} 3 & 24 & 0 & 14 & 16 \\ 0 & 16 & 0 & 0 & 0 \\ 15 & 3 & 7 & 11 & 23 \\ 11 & 24 & 0 & 9 & 17 \\ 24 & 15 & 0 & 5 & 10 \end{pmatrix}, 1$$

The kernel has 2040 orbits on the quadric.

The orbit length are $[8^{2031}, 4^6, 2, 1^2]$

Induced action on orbit $O_1 = \{2, 4, 6, 7, 8, 9, 11, 12, 13, 14, 17, 20, 21, 22, 25, 26\}$ (length 16)

The induced group has order 16 and is generated by:

g_1 =(3, 8)(4, 10)(5, 6)(7, 9)(11, 15)(12, 14)(13, 16)(1, 2)

g_2 =(2, 8)(4, 16)(5, 11)(6, 15)(7, 12)(9, 14)(10, 13)(1, 3)

g_3 =(3, 11, 16, 9, 8, 15, 13, 7)(1, 12, 10, 6, 2, 14, 4, 5)

Kernel has order 1 and is generated by:

Induced action on orbit $O_2 = \{5, 10, 15, 16, 18, 19, 23, 24\}$ (length 8)

The induced group has order 16 and is generated by:

g_1 =(2, 4)(5, 8)(6, 7)(1, 3)

g_2 =(2, 6)(3, 8)(4, 7)(1, 5)

g_3 =(1, 8, 4, 7, 3, 5, 2, 6)

Kernel has order 1 and is generated by: