

1 BLT set 5 over GF(27)

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

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

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

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

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

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

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

$$P_7 = (1, 5, 21, 26, 19)$$

$$P_8 = (1, 7, 15, 26, 19)$$

$$P_9 = (1, 21, 10, 2, 9)$$

$$P_{10} = (1, 15, 20, 2, 9)$$

$$P_{11} = (1, 17, 23, 8, 26)$$

$$P_{12} = (1, 22, 16, 8, 26)$$

$$P_{13} = (1, 13, 7, 2, 6)$$

$$P_{14} = (1, 26, 5, 2, 6)$$

$$P_{15} = (1, 9, 22, 20, 26)$$

$$P_{16} = (1, 18, 17, 20, 26)$$

$$P_{17} = (1, 25, 13, 9, 5)$$

$$P_{18} = (1, 14, 26, 9, 5)$$

$$P_{19} = (1, 16, 11, 24, 20)$$

$$P_{20} = (1, 23, 19, 24, 20)$$

$$P_{21} = (1, 16, 20, 9, 25)$$

$$P_{22} = (1, 23, 10, 9, 25)$$

$$P_{23} = (1, 22, 13, 16, 20)$$

$$P_{24} = (1, 17, 26, 16, 20)$$

$$P_{25} = (1, 2, 26, 3, 24)$$

$$P_{26} = (1, 1, 13, 3, 24)$$

$$P_{27} = (1, 23, 3, 21, 17)$$

$$P_{28} = (1, 16, 6, 21, 17)$$

Stabilizer of order 156 is generated by:

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

$$g_2 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 6 & 0 & 0 \\ 0 & 11 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 13 \\ 0 & 0 & 0 & 22 & 0 \end{pmatrix}, 0$$

$$g_3 = \begin{pmatrix} 15 & 0 & 0 & 21 & 10 \\ 0 & 21 & 0 & 0 & 0 \\ 0 & 0 & 4 & 0 & 0 \\ 13 & 0 & 0 & 7 & 4 \\ 13 & 0 & 0 & 23 & 22 \end{pmatrix}, 1$$

$$g_4 = \begin{pmatrix} 15 & 0 & 0 & 26 & 26 \\ 0 & 3 & 0 & 0 & 0 \\ 0 & 0 & 19 & 0 & 0 \\ 11 & 0 & 0 & 25 & 2 \\ 1 & 0 & 0 & 3 & 11 \end{pmatrix}, 1$$

$$g_5 = \begin{pmatrix} 1 & 0 & 0 & 14 & 0 \\ 0 & 24 & 0 & 0 & 0 \\ 0 & 0 & 5 & 0 & 0 \\ 0 & 0 & 0 & 13 & 0 \\ 23 & 0 & 0 & 5 & 22 \end{pmatrix}, 1$$

Induced action on the BLT-set:

The induced group has order 156 and is generated by:

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

$$g_2 = (1, 2)(3, 6)(4, 5)(9, 11)(10, 12)(13, 15)(14, 16)(17, 19)(18, 20)(21, 23)(22, 24)(25, 27)(26, 28)$$

$$g_3 = (3, 5, 17, 4, 6, 18)(7, 16, 9, 8, 15, 10)(11, 28, 21, 12, 27, 22)(13, 26, 20, 14, 25, 19)(23, 24)$$

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

$$g_5 = (3, 15, 19, 4, 16, 20)(5, 12, 23, 6, 11, 24)(7, 17, 21, 8, 18, 22)(9, 10)(13, 28, 25, 14, 27, 26)$$

Kernel has order 1 and is generated by:

There are 2 orbits on the BLT set.

The orbit length are [26, 2]

The orbits are:

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

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

The actions induced on the orbits are:

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

The induced group has order 2 and is generated by:

$$g_1 = \text{id}$$

$$g_2 = (1, 2)$$

$$g_3 = \text{id}$$

$g_4 = \text{id}$

$g_5 = \text{id}$

Kernel has order 78 and is generated by:

$$b_1 = \begin{pmatrix} 1 & 0 & 0 & 14 & 0 \\ 0 & 24 & 0 & 0 & 0 \\ 0 & 0 & 5 & 0 & 0 \\ 0 & 0 & 0 & 13 & 0 \\ 23 & 0 & 0 & 5 & 22 \end{pmatrix}, 1$$

$$b_2 = \begin{pmatrix} 24 & 0 & 0 & 25 & 13 \\ 0 & 25 & 0 & 0 & 0 \\ 0 & 0 & 9 & 0 & 0 \\ 21 & 0 & 0 & 21 & 15 \\ 2 & 0 & 0 & 16 & 10 \end{pmatrix}, 0$$

The kernel has 279 orbits on the quadric.

The orbit length are $[78^{256}, 26^{17}, 13^2, 1^4]$

Induced action on orbit $O_2 = \{3, 2163, 2216, 2269, 2375, 2534, 2587, 2693, 3064, 3117, 3223, 3382, 3488\}$
(length 13)

The induced group has order 39 and is generated by:

$g_1 = (2, 11, 3)(4, 12, 7)(5, 8, 13)(6, 9, 10)$

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

Kernel has order 2 and is generated by:

$$b_1 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 2 & 0 & 0 & 0 \\ 0 & 0 & 2 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{pmatrix}, 0$$

The kernel has 10235 orbits on the quadric.

The orbit length are $[2^{10205}, 1^{30}]$

Induced action on orbit $O_3 = \{4, 5\}$ (length 2)

The induced group has order 2 and is generated by:

$$g_1 = (1, 2)$$

Kernel has order 1 and is generated by:

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

The induced group has order 156 and is generated by:

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

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

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

$$g_4 = (1, 18, 4, 2, 17, 3)(5, 12, 9, 6, 11, 10)(7, 24, 21, 8, 23, 22)(13, 26, 16, 14, 25, 15)(19, 20)$$

$$g_5 = (1, 13, 17, 2, 14, 18)(3, 10, 21, 4, 9, 22)(5, 15, 19, 6, 16, 20)(7, 8)(11, 26, 23, 12, 25, 24)$$

Kernel has order 1 and is generated by: