

1 BLT set 5 over GF(37)

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

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

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

$$P_3 = (0, 1, 18, 36, 18)$$

$$P_4 = (0, 1, 23, 18, 9)$$

$$P_5 = (0, 1, 6, 9, 24)$$

$$P_6 = (0, 1, 29, 1, 8)$$

$$P_7 = (0, 1, 22, 2, 26)$$

$$P_8 = (1, 32, 7, 3, 36)$$

$$P_9 = (1, 14, 3, 27, 8)$$

$$P_{10} = (1, 22, 30, 4, 29)$$

$$P_{11} = (1, 8, 33, 22, 30)$$

$$P_{12} = (1, 36, 23, 15, 36)$$

$$P_{13} = (1, 16, 32, 5, 1)$$

$$P_{14} = (1, 9, 22, 26, 8)$$

$$P_{15} = (1, 4, 22, 34, 5)$$

$$P_{16} = (1, 5, 1, 14, 26)$$

$$P_{17} = (1, 29, 10, 10, 19)$$

$$P_{18} = (1, 12, 31, 35, 20)$$

$$P_{19} = (1, 14, 30, 5, 12)$$

$$P_{20} = (1, 36, 22, 11, 12)$$

$$P_{21} = (1, 6, 34, 23, 12)$$

$$P_{22} = (1, 32, 28, 4, 7)$$

$$P_{23} = (1, 28, 6, 33, 33)$$

$$P_{24} = (1, 30, 24, 2, 28)$$

$$P_{25} = (1, 11, 8, 24, 4)$$

$$P_{26} = (1, 20, 12, 35, 28)$$

$$P_{27} = (1, 2, 12, 26, 9)$$

$$P_{28} = (1, 36, 2, 33, 9)$$

$$P_{29} = (1, 21, 14, 33, 9)$$

$$P_{30} = (1, 24, 34, 15, 22)$$

$$P_{31} = (1, 11, 18, 4, 15)$$

$$P_{32} = (1, 6, 33, 27, 31)$$

$$P_{33} = (1, 5, 27, 2, 6)$$

$$P_{34} = (1, 9, 15, 32, 5)$$

$$P_{35} = (1, 14, 27, 4, 7)$$

$$P_{36} = (1, 19, 1, 8, 16)$$

$$P_{37} = (1, 34, 5, 2, 7)$$

$$P_{38} = (1, 32, 27, 36, 14)$$

Stabilizer of order 4 is generated by:

$$g_1 = \begin{pmatrix} 24 & 0 & 0 & 15 & 11 \\ 0 & 35 & 28 & 1 & 19 \\ 0 & 4 & 35 & 33 & 35 \\ 24 & 35 & 19 & 8 & 16 \\ 26 & 33 & 1 & 27 & 8 \end{pmatrix}$$

$$g_2 = \begin{pmatrix} 8 & 29 & 34 & 5 & 27 \\ 17 & 23 & 11 & 34 & 8 \\ 33 & 1 & 23 & 7 & 5 \\ 32 & 5 & 8 & 28 & 36 \\ 21 & 7 & 34 & 22 & 28 \end{pmatrix}$$

Induced action on the BLT-set:

The induced group has order 4 and is generated by:

$$g_1 = (1, 4)(2, 3)(5, 16)(6, 11)(7, 21)(8, 23)(9, 10)(12, 36)(13, 37)(14, 18)(15, 28)(17, 32)(19, 34)(20, 29)(22, 27)(24, 31)(25, 26)(30, 33)(35, 38)$$

$$g_2 = (1, 37)(2, 14)(3, 18)(4, 13)(5, 29)(6, 10)(7, 21)(8, 25)(9, 11)(12, 38)(15, 22)(16, 20)(17,$$

$34)(19, 32)(23, 26)(24, 30)(27, 28)(31, 33)(35, 36)$

group order is small, so we list all elements $a_1 = \text{id}$

$a_2 = (1, 4)(2, 3)(5, 16)(6, 11)(7, 21)(8, 23)(9, 10)(12, 36)(13, 37)(14, 18)(15, 28)(17, 32)(19, 34)(20, 29)(22, 27)(24, 31)(25, 26)(30, 33)(35, 38)$

$a_3 = (1, 37)(2, 14)(3, 18)(4, 13)(5, 29)(6, 10)(7, 21)(8, 25)(9, 11)(12, 38)(15, 22)(16, 20)(17, 34)(19, 32)(23, 26)(24, 30)(27, 28)(31, 33)(35, 36)$

$a_4 = (1, 13)(2, 18)(3, 14)(4, 37)(5, 20)(6, 9)(8, 26)(10, 11)(12, 35)(15, 27)(16, 29)(17, 19)(22, 28)(23, 25)(24, 33)(30, 31)(32, 34)(36, 38)$

Kernel has order 1 and is generated by:

There are 10 orbits on the BLT set.

The orbit length are $[4^9, 2]$

The orbits are:

$O_0 = \{1, 4, 13, 37\}$ (length 4)

$O_1 = \{2, 3, 14, 18\}$ (length 4)

$O_2 = \{5, 16, 20, 29\}$ (length 4)

$O_3 = \{6, 9, 10, 11\}$ (length 4)

$O_4 = \{7, 21\}$ (length 2)

$O_5 = \{8, 23, 25, 26\}$ (length 4)

$O_6 = \{12, 35, 36, 38\}$ (length 4)

$O_7 = \{15, 22, 27, 28\}$ (length 4)

$O_8 = \{17, 19, 32, 34\}$ (length 4)

$O_9 = \{24, 30, 31, 33\}$ (length 4)

The actions induced on the orbits are:

Induced action on orbit $O_0 = \{1, 4, 13, 37\}$ (length 4)

The induced group has order 4 and is generated by:

$g_1 = (1, 2)(3, 4)$

$g_2 = (1, 4)(2, 3)$

group order is small, so we list all elements $a_1 = \text{id}$

$$a_2 = (1, 2)(3, 4)$$

$$a_3 = (1, 4)(2, 3)$$

$$a_4 = (1, 3)(2, 4)$$

Kernel has order 1 and is generated by:

Induced action on orbit $O_1 = \{2, 3, 14, 18\}$ (length 4)

The induced group has order 4 and is generated by:

$$g_1 = (1, 2)(3, 4)$$

$$g_2 = (1, 3)(2, 4)$$

group order is small, so we list all elements $a_1 = \text{id}$

$$a_2 = (1, 2)(3, 4)$$

$$a_3 = (1, 3)(2, 4)$$

$$a_4 = (1, 4)(2, 3)$$

Kernel has order 1 and is generated by:

Induced action on orbit $O_2 = \{5, 16, 20, 29\}$ (length 4)

The induced group has order 4 and is generated by:

$$g_1 = (1, 2)(3, 4)$$

$$g_2 = (1, 4)(2, 3)$$

group order is small, so we list all elements $a_1 = \text{id}$

$$a_2 = (1, 2)(3, 4)$$

$$a_3 = (1, 4)(2, 3)$$

$$a_4 = (1, 3)(2, 4)$$

Kernel has order 1 and is generated by:

Induced action on orbit $O_3 = \{6, 9, 10, 11\}$ (length 4)

The induced group has order 4 and is generated by:

$$g_1 = (1, 4)(2, 3)$$

$$g_2 = (1, 3)(2, 4)$$

group order is small, so we list all elements $a_1 = \text{id}$

$$a_2 = (1, 4)(2, 3)$$

$$a_3 = (1, 3)(2, 4)$$

$$a_4 = (1, 2)(3, 4)$$

Kernel has order 1 and is generated by:

Induced action on orbit $O_4 = \{7, 21\}$ (length 2)

The induced group has order 2 and is generated by:

$$g_1 = (1, 2)$$

$$g_2 = (1, 2)$$

group order is small, so we list all elements $a_1 = \text{id}$

$$a_2 = (1, 2)$$

Kernel has order 2 and is generated by:

$$b_1 = \begin{pmatrix} 15 & 34 & 15 & 5 & 16 \\ 26 & 9 & 18 & 19 & 26 \\ 17 & 19 & 9 & 3 & 7 \\ 8 & 7 & 26 & 21 & 20 \\ 21 & 3 & 19 & 8 & 21 \end{pmatrix}$$

The kernel has 26049 orbits on the quadric.

The orbit length are $[2^{26011}, 1^{38}]$

Induced action on orbit $O_0 = \{1, 7802\}$ (length 2)

The induced group has order 2 and is generated by:

$$g_1 = (1, 2)$$

group order is small, so we list all elements $a_1 = \text{id}$

$$a_2 = (1, 2)$$

Kernel has order 1 and is generated by:

Induced action on orbit $O_5 = \{8, 23, 25, 26\}$ (length 4)

The induced group has order 4 and is generated by:

$$g_1 = (1, 2)(3, 4)$$

$$g_2 = (1, 3)(2, 4)$$

group order is small, so we list all elements $a_1 = \text{id}$

$$a_2 = (1, 2)(3, 4)$$

$$a_3 = (1, 3)(2, 4)$$

$$a_4 = (1, 4)(2, 3)$$

Kernel has order 1 and is generated by:

Induced action on orbit $O_6 = \{12, 35, 36, 38\}$ (length 4)

The induced group has order 4 and is generated by:

$$g_1 = (1, 3)(2, 4)$$

$$g_2 = (1, 4)(2, 3)$$

group order is small, so we list all elements $a_1 = \text{id}$

$$a_2 = (1, 3)(2, 4)$$

$$a_3 = (1, 4)(2, 3)$$

$$a_4 = (1, 2)(3, 4)$$

Kernel has order 1 and is generated by:

Induced action on orbit $O_7 = \{15, 22, 27, 28\}$ (length 4)

The induced group has order 4 and is generated by:

$$g_1 = (1, 4)(2, 3)$$

$$g_2 = (1, 2)(3, 4)$$

group order is small, so we list all elements $a_1 = \text{id}$

$$a_2 = (1, 4)(2, 3)$$

$$a_3 = (1, 2)(3, 4)$$

$$a_4 = (1, 3)(2, 4)$$

Kernel has order 1 and is generated by:

Induced action on orbit $O_8 = \{17, 19, 32, 34\}$ (length 4)

The induced group has order 4 and is generated by:

$$g_1 = (1, 3)(2, 4)$$

$$g_2 = (1, 4)(2, 3)$$

group order is small, so we list all elements $a_1 = \text{id}$

$$a_2 = (1, 3)(2, 4)$$

$$a_3 = (1, 4)(2, 3)$$

$$a_4 = (1, 2)(3, 4)$$

Kernel has order 1 and is generated by:

Induced action on orbit $O_9 = \{24, 30, 31, 33\}$ (length 4)

The induced group has order 4 and is generated by:

$$g_1 = (1, 3)(2, 4)$$

$$g_2 = (1, 2)(3, 4)$$

group order is small, so we list all elements $a_1 = \text{id}$

$$a_2 = (1, 3)(2, 4)$$

$$a_3 = (1, 2)(3, 4)$$

$$a_4 = (1, 4)(2, 3)$$

Kernel has order 1 and is generated by: