

1 BLT set 3 over GF(13)

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

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

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

$$P_3 = (0, 1, 6, 12, 6)$$

$$P_4 = (0, 1, 8, 6, 3)$$

$$P_5 = (0, 1, 6, 3, 11)$$

$$P_6 = (0, 1, 2, 7, 9)$$

$$P_7 = (1, 12, 11, 11, 8)$$

$$P_8 = (1, 9, 2, 6, 12)$$

$$P_9 = (1, 6, 4, 11, 6)$$

$$P_{10} = (1, 6, 9, 8, 11)$$

$$P_{11} = (1, 4, 2, 5, 6)$$

$$P_{12} = (1, 4, 11, 10, 2)$$

$$P_{13} = (1, 10, 2, 10, 7)$$

$$P_{14} = (1, 10, 11, 2, 3)$$

Stabilizer of order 48 is generated by:

$$g_1 = \begin{pmatrix} 12 & 0 & 0 & 0 & 0 \\ 0 & 12 & 7 & 1 & 7 \\ 0 & 0 & 12 & 0 & 0 \\ 0 & 0 & 7 & 0 & 7 \\ 0 & 0 & 1 & 2 & 0 \end{pmatrix}$$
$$g_2 = \begin{pmatrix} 12 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 5 & 1 & 4 & 2 \\ 0 & 2 & 0 & 12 & 0 \\ 0 & 4 & 0 & 0 & 12 \end{pmatrix}$$

$$g_3 = \begin{pmatrix} 9 & 0 & 0 & 11 & 1 \\ 0 & 12 & 0 & 0 & 0 \\ 0 & 0 & 12 & 0 & 0 \\ 7 & 0 & 0 & 8 & 2 \\ 12 & 0 & 0 & 8 & 8 \end{pmatrix}$$

$$g_4 = \begin{pmatrix} 12 & 0 & 0 & 0 & 0 \\ 0 & 12 & 0 & 0 & 0 \\ 0 & 2 & 12 & 6 & 9 \\ 0 & 9 & 0 & 0 & 8 \\ 0 & 6 & 0 & 5 & 0 \end{pmatrix}$$

$$g_5 = \begin{pmatrix} 2 & 4 & 0 & 4 & 9 \\ 0 & 8 & 0 & 0 & 0 \\ 9 & 12 & 5 & 12 & 11 \\ 10 & 12 & 0 & 1 & 4 \\ 10 & 9 & 0 & 9 & 12 \end{pmatrix}$$

Induced action on the BLT-set:

The induced group has order 48 and is generated by:

$$g_1 = (1, 3)(9, 10)(11, 12)(13, 14)$$

$$g_2 = (2, 4)(5, 6)(7, 8)(9, 10)(11, 12)(13, 14)$$

$$g_3 = (5, 8)(6, 7)(9, 14)(10, 13)$$

$$g_4 = (2, 5)(4, 6)(11, 13)(12, 14)$$

$$g_5 = (2, 13, 7, 12, 5, 10, 4, 14, 8, 11, 6, 9)$$

Kernel has order 1 and is generated by:

There are 2 orbits on the BLT set.

The orbit length are [12, 2]

The orbits are:

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

$O_1 = \{2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14\}$ (length 12)

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:

$$g_1 = (1, 2)$$

$$g_2 = \text{id}$$

$$g_3 = \text{id}$$

$$g_4 = \text{id}$$

$$g_5 = \text{id}$$

Kernel has order 24 and is generated by:

$$b_1 = \begin{pmatrix} 11 & 9 & 0 & 9 & 4 \\ 0 & 5 & 0 & 0 & 0 \\ 11 & 1 & 8 & 10 & 4 \\ 2 & 1 & 0 & 7 & 5 \\ 11 & 4 & 0 & 5 & 7 \end{pmatrix}$$

$$b_2 = \begin{pmatrix} 8 & 8 & 0 & 4 & 7 \\ 0 & 5 & 0 & 0 & 0 \\ 4 & 1 & 8 & 1 & 2 \\ 10 & 12 & 0 & 2 & 2 \\ 2 & 8 & 0 & 11 & 2 \end{pmatrix}$$

$$b_3 = \begin{pmatrix} 9 & 0 & 0 & 11 & 1 \\ 0 & 12 & 0 & 0 & 0 \\ 0 & 0 & 12 & 0 & 0 \\ 7 & 0 & 0 & 8 & 2 \\ 12 & 0 & 0 & 8 & 8 \end{pmatrix}$$

The kernel has 126 orbits on the quadric.

The orbit length are $[24^{77}, 12^{43}, 4^3, 2, 1^2]$

Induced action on orbit $O_{122} = \{575, 748\}$ (length 2)

The induced group has order 2 and is generated by:

$$g_1 = (1, 2)$$

$$g_2 = (1, 2)$$

$$g_3 = (1, 2)$$

Kernel has order 12 and is generated by:

$$b_1 = \begin{pmatrix} 4 & 0 & 0 & 2 & 12 \\ 0 & 12 & 0 & 0 & 0 \\ 7 & 6 & 12 & 12 & 4 \\ 5 & 2 & 0 & 12 & 12 \\ 9 & 3 & 0 & 1 & 10 \end{pmatrix}$$

$$b_2 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{pmatrix}$$

$$b_3 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{pmatrix}$$

$$b_4 = \begin{pmatrix} 5 & 5 & 0 & 9 & 6 \\ 0 & 8 & 0 & 0 & 0 \\ 9 & 10 & 5 & 6 & 2 \\ 3 & 5 & 0 & 10 & 3 \\ 11 & 12 & 0 & 10 & 10 \end{pmatrix}$$

The kernel has 205 orbits on the quadric.

The orbit length are $[12^{196}, 6^2, 4^3, 1^4]$

Induced action on orbit $O_{135} = \{292, 1101, 1637, 2208\}$ (length 4)

The induced group has order 4 and is generated by:

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

$$g_2 = \text{id}$$

$$g_3 = \text{id}$$

$$g_4 = (1, 2, 3, 4)$$

Kernel has order 3 and is generated by:

$$b_1 = \begin{pmatrix} 4 & 0 & 0 & 2 & 12 \\ 0 & 1 & 0 & 0 & 0 \\ 7 & 11 & 1 & 3 & 6 \\ 5 & 4 & 0 & 12 & 12 \\ 9 & 7 & 0 & 1 & 10 \end{pmatrix}$$

The kernel has 804 orbits on the quadric.

The orbit length are $[3^{788}, 1^{16}]$

Induced action on orbit $O_1 = \{2, 104, 2303\}$ (length 3)

The induced group has order 3 and is generated by:

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

Kernel has order 1 and is generated by:

Induced action on orbit $O_1 = \{2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14\}$ (length 12)

The induced group has order 48 and is generated by:

$$g_1 = (7, 8)(9, 10)(11, 12)$$

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

$$g_3 = (3, 6)(4, 5)(7, 12)(8, 11)$$

$$g_4 = (1, 3)(2, 4)(9, 11)(10, 12)$$

$$g_5 = (1, 11, 5, 10, 3, 8, 2, 12, 6, 9, 4, 7)$$

Kernel has order 1 and is generated by: