

# 1 BLT set 1 over $\text{GF}(5)$

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

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

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

$$P_3 = (0, 1, 2, 4, 2)$$

$$P_4 = (0, 1, 3, 2, 1)$$

$$P_5 = (0, 1, 2, 1, 3)$$

$$P_6 = (0, 1, 3, 3, 4)$$

Stabilizer of order 1440 is generated by:

$$g_1 = \begin{pmatrix} 3 & 0 & 0 & 4 & 3 \\ 0 & 4 & 0 & 0 & 0 \\ 0 & 2 & 4 & 3 & 4 \\ 4 & 4 & 0 & 4 & 1 \\ 2 & 3 & 0 & 4 & 4 \end{pmatrix}$$

$$g_2 = \begin{pmatrix} 4 & 0 & 0 & 0 & 0 \\ 0 & 0 & 3 & 0 & 0 \\ 0 & 2 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 2 \\ 0 & 0 & 0 & 3 & 0 \end{pmatrix}$$

$$g_3 = \begin{pmatrix} 3 & 0 & 0 & 1 & 2 \\ 0 & 4 & 0 & 0 & 0 \\ 0 & 0 & 4 & 0 & 0 \\ 1 & 0 & 0 & 3 & 3 \\ 3 & 0 & 0 & 2 & 3 \end{pmatrix}$$

$$g_4 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 4 & 0 & 0 & 0 \\ 0 & 0 & 4 & 0 & 0 \\ 0 & 0 & 0 & 4 & 0 \\ 0 & 0 & 0 & 0 & 4 \end{pmatrix}$$

$$g_5 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 3 & 0 & 0 & 0 \\ 0 & 0 & 2 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{pmatrix}$$

Induced action on the BLT-set:

The induced group has order 120 and is generated by:

$$g_1 = (2, 3)(4, 5)$$

$$g_2 = (1, 2)(4, 6)$$

$$g_3 = \text{id}$$

$$g_4 = \text{id}$$

$$g_5 = (3, 6, 5, 4)$$

Kernel has order 12 and is generated by:

$$b_1 = \begin{pmatrix} 2 & 0 & 0 & 1 & 2 \\ 0 & 4 & 0 & 0 & 0 \\ 0 & 0 & 4 & 0 & 0 \\ 4 & 0 & 0 & 3 & 3 \\ 2 & 0 & 0 & 2 & 3 \end{pmatrix}$$

$$b_2 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 4 & 0 & 0 & 0 \\ 0 & 0 & 4 & 0 & 0 \\ 0 & 0 & 0 & 4 & 0 \\ 0 & 0 & 0 & 0 & 4 \end{pmatrix}$$

The kernel has 31 orbits on the quadric.

The orbit length are  $[6^{25}, 1^6]$

Induced action on orbit  $O_2 = \{3, 12, 73, 82, 91, 100\}$  (length 6)

The induced group has order 12 and is generated by:

$$g_1 = (1, 5, 3, 2, 6, 4)$$

$$g_2 = (3, 6)(4, 5)$$

Kernel has order 1 and is generated by:

There are 1 orbits on the BLT set.

The orbit length are  $[6]$

The orbits are:

$$O_0 = \{1, 2, 3, 4, 5, 6\} \text{ (length 6)}$$