1 BLT set 1 over $\mathbf{GF}(9)$

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

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

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

$P_3 = (0, 1, 7, 2, 7)$

$P_4 = (0, 1, 7, 1, 5)$

$P_5 = (0, 1, 3, 7, 4)$

$P_6 = (0, 1, 6, 3, 1)$

$P_7 = (0, 1, 5, 4, 3)$

$P_8 = (0, 1, 6, 6, 2)$

$P_9 = (0, 1, 3, 5, 8)$

$P_{10} = (0, 1, 5, 8, 6)$

Stabilizer of order 28800 is generated by:

$$g_1 = \begin{pmatrix} 3 & 0 & 0 & 6 & 1 \\ 0 & 2 & 0 & 0 & 0 \\ 0 & 0 & 2 & 0 & 0 \\ 2 & 0 & 0 & 4 & 4 \\ 3 & 0 & 0 & 2 & 4 \end{pmatrix}, 0$$

$$g_2 = \begin{pmatrix} 7 & 0 & 0 & 4 & 6 \\ 0 & 2 & 0 & 0 & 0 \\ 0 & 0 & 2 & 0 & 0 \\ 3 & 0 & 0 & 8 & 1 \\ 8 & 0 & 0 & 4 & 8 \end{pmatrix}, 0$$

$$g_3 = \begin{pmatrix} 2 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 5 \\ 0 & 0 & 0 & 3 & 0 \end{pmatrix}, 0$$

$$g_4 = \begin{pmatrix} 6 & 0 & 0 & 4 & 7 \\ 0 & 6 & 0 & 0 & 0 \\ 0 & 4 & 7 & 8 & 7 \\ 2 & 6 & 0 & 1 & 2 \\ 3 & 8 & 0 & 1 & 8 \end{pmatrix}, 1$$

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

$$g_6 = \begin{pmatrix} 7 & 0 & 0 & 7 & 2 \\ 0 & 3 & 4 & 6 & 4 \\ 0 & 8 & 5 & 8 & 7 \\ 3 & 6 & 4 & 2 & 6 \\ 8 & 8 & 7 & 3 & 4 \end{pmatrix}, 1$$

$$g_7 = \begin{pmatrix} 2 & 0 & 0 & 0 & 0 \\ 0 & 3 & 0 & 0 & 0 \\ 0 & 0 & 5 & 0 & 0 \\ 0 & 0 & 0 & 3 & 0 \\ 0 & 0 & 0 & 0 & 5 \end{pmatrix}, 1$$

$$g_8 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 6 & 0 & 0 & 0 \\ 0 & 4 & 7 & 4 & 5 \\ 0 & 3 & 0 & 3 & 0 \\ 0 & 4 & 0 & 0 & 5 \end{pmatrix}, 1$$

$$g_9 = \begin{pmatrix} 2 & 0 & 0 & 0 & 0 \\ 0 & 2 & 0 & 0 & 0 \\ 0 & 0 & 2 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{pmatrix}, 0$$

$$g_{10} = \begin{pmatrix} 7 & 0 & 0 & 5 & 1 \\ 0 & 5 & 4 & 1 & 6 \\ 0 & 0 & 3 & 0 & 0 \\ 3 & 0 & 7 & 7 & 7 \\ 8 & 0 & 2 & 5 & 3 \end{pmatrix}, 1$$

$$g_{11} = \begin{pmatrix} 3 & 0 & 0 & 4 & 7 \\ 0 & 7 & 0 & 0 & 0 \\ 0 & 8 & 6 & 3 & 8 \\ 1 & 8 & 0 & 1 & 2 \\ 6 & 5 & 0 & 1 & 8 \end{pmatrix}, 1$$

$$g_{12} = \begin{pmatrix} 2 & 0 & 0 & 0 & 0 \\ 0 & 5 & 0 & 0 & 0 \\ 0 & 0 & 3 & 0 & 0 \\ 0 & 0 & 0 & 3 & 0 \\ 0 & 0 & 0 & 0 & 5 \end{pmatrix}, 1$$

$$g_{13} = \begin{pmatrix} 2 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 6 & 0 \\ 0 & 0 & 0 & 0 & 7 \end{pmatrix}, 1$$

Induced action on the BLT-set:

The induced group has order 1440 and is generated by:

$g_1 =$id

$g_2 =$id

$g_3 =$id

$g_4 =(2, 3)(7, 8)(9, 10)$

$g_5 =$id

$g_6 =(1, 3)(2, 4)(8, 9)$

$g_7 =(5, 6)(7, 10)(8, 9)$

$g_8 =(2, 4)(5, 7)(6, 10)$

$g_9 =(3, 4)(5, 9)(6, 8)(7, 10)$

$g_{10} =(1, 5)(4, 6)(7, 8)$

$g_{11} =(2, 6)(3, 5)(7, 9)$

$g_{12} =(3, 7)(4, 10)(5, 9)$

$g_{13} =(3, 5, 4, 9)(6, 7, 8, 10)$

Kernel has order 20 and is generated by:

$$b_1 = \begin{pmatrix} 3 & 0 & 0 & 6 & 1 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 2 & 0 & 0 & 5 & 6 \\ 3 & 0 & 0 & 5 & 5 \end{pmatrix}, 0$$

$$b_2 = \begin{pmatrix} 7 & 0 & 0 & 8 & 3 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 6 & 0 & 0 & 6 & 3 \\ 4 & 0 & 0 & 7 & 6 \end{pmatrix}, 0$$

$$b_3 = \begin{pmatrix} 2 & 0 & 0 & 0 & 0 \\ 0 & 2 & 0 & 0 & 0 \\ 0 & 0 & 2 & 0 & 0 \\ 0 & 0 & 0 & 2 & 0 \\ 0 & 0 & 0 & 0 & 2 \end{pmatrix}, 0$$

$$b_4 = \begin{pmatrix} 2 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{pmatrix}, 0$$

The kernel has 91 orbits on the quadric.

The orbit length are $[10^{81}, 1^{10}]$

Induced action on orbit $O_2 = \{3, 20, 237, 254, 271, 288, 305, 322, 339, 356\}$ (length 10)

The induced group has order 20 and is generated by:

$g_1 =$(1, 7)(2, 6)(3, 10)(4, 8)(5, 9)

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

$g_3 =$id

$g_4 =$(3, 4)(5, 8)(6, 10)(7, 9)

Kernel has order 1 and is generated by:

There are 1 orbits on the BLT set.

The orbit length are [10]

The orbits are:

$O_0 = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$ (length 10)