1 BLT set 3 over GF(19)

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

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

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

$P_3 = (0, 1, 9, 18, 9)$

$P_4 = (0, 1, 7, 9, 14)$

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

$P_6 = (1, 11, 9, 14, 1)$

$P_7 = (1, 16, 1, 13, 6)$

$P_8 = (1, 5, 11, 12, 8)$

$P_9 = (1, 14, 14, 16, 15)$

$P_{10} = (1, 16, 16, 15, 12)$

$P_{11} = (1, 16, 5, 4, 13)$

$P_{12} = (1, 10, 15, 4, 5)$

$P_{13} = (1, 18, 10, 12, 15)$

$P_{14} = (1, 2, 10, 11, 5)$

$P_{15} = (1, 3, 10, 10, 14)$

$P_{16} = (1, 13, 10, 13, 6)$

$P_{17} = (1, 9, 4, 17, 9)$

$P_{18} = (1, 6, 6, 7, 11)$

$P_{19} = (1, 4, 6, 14, 5)$

$P_{20} = (1, 4, 4, 6, 13)$

Stabilizer of order 16 is generated by:

$$g_1 = \begin{pmatrix} 15 & 0 & 0 & 7 & 6 \\ 0 & 18 & 0 & 0 & 0 \\ 0 & 18 & 18 & 13 & 16 \\ 3 & 16 & 0 & 12 & 4 \\ 13 & 13 & 0 & 16 & 12 \end{pmatrix}$$

$$g_2 = \begin{pmatrix} 4 & 0 & 0 & 12 & 13 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 16 & 0 & 0 & 8 & 6 \\ 6 & 0 & 0 & 5 & 8 \end{pmatrix}$$

$$g_3 = \begin{pmatrix} 15 & 4 & 0 & 7 & 6 \\ 0 & 1 & 0 & 0 & 0 \\ 2 & 6 & 1 & 1 & 9 \\ 3 & 9 & 0 & 12 & 4 \\ 13 & 1 & 0 & 16 & 12 \end{pmatrix}$$

$$g_4 = \begin{pmatrix} 18 & 0 & 10 & 0 & 1 \\ 5 & 4 & 5 & 8 & 11 \\ 8 & 11 & 4 & 1 & 6 \\ 15 & 4 & 11 & 9 & 6 \\ 10 & 8 & 8 & 16 & 4 \end{pmatrix}$$

Induced action on the BLT-set:

The induced group has order 16 and is generated by:

g_1 =(2, 5)(3, 4)(6, 8)(9, 10)(11, 12)(13, 14)(15, 16)(17, 18)(19, 20)

g_2 =(6, 8)(9, 10)(11, 12)(17, 19)(18, 20)

g_3 =(2, 15)(3, 14)(4, 13)(5, 16)(6, 12)(8, 11)

g_4 =(1, 7)(2, 13, 16, 3)(4, 15, 14, 5)(6, 17, 12, 20)(8, 19, 11, 18)

Kernel has order 1 and is generated by:

There are 4 orbits on the BLT set.

The orbit length are $[8^2, 2^2]$

The orbits are:

$O_0 = \{1, 7\}$ (length 2)

$O_1 = \{2, 3, 4, 5, 13, 14, 15, 16\}$ (length 8)

$O_2 = \{6, 8, 11, 12, 17, 18, 19, 20\}$ (length 8)

$O_3 = \{9, 10\}$ (length 2)

The actions induced on the orbits are:

Induced action on orbit $O_0 = \{1, 7\}$ (length 2)

The induced group has order 2 and is generated by:

g_1 =id

g_2 =id

g_3 =id

g_4 =(1, 2)

Kernel has order 8 and is generated by:

$$b_1 = \begin{pmatrix} 18 & 0 & 0 & 0 & 0 \\ 0 & 18 & 0 & 0 & 0 \\ 0 & 18 & 18 & 13 & 16 \\ 0 & 16 & 0 & 0 & 10 \\ 0 & 13 & 0 & 2 & 0 \end{pmatrix}$$

$$b_2 = \begin{pmatrix} 4 & 0 & 0 & 12 & 13 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 16 & 0 & 0 & 8 & 6 \\ 6 & 0 & 0 & 5 & 8 \end{pmatrix}$$

$$b_3 = \begin{pmatrix} 4 & 15 & 0 & 12 & 13 \\ 0 & 18 & 0 & 0 & 0 \\ 17 & 12 & 18 & 12 & 7 \\ 16 & 7 & 0 & 8 & 6 \\ 6 & 12 & 0 & 5 & 8 \end{pmatrix}$$

The kernel has 1051 orbits on the quadric.

The orbit length are $[8^{774}, 4^{248}, 2^{27}, 1^2]$

Induced action on orbit $O_{72} = \{105, 2328\}$ (length 2)

The induced group has order 2 and is generated by:

g_1 =id

g_2 =id

g_3 =(1, 2)

Kernel has order 4 and is generated by:

$$b_1 = \begin{pmatrix} 15 & 0 & 0 & 7 & 6 \\ 0 & 18 & 0 & 0 & 0 \\ 0 & 18 & 18 & 13 & 16 \\ 3 & 16 & 0 & 12 & 4 \\ 13 & 13 & 0 & 16 & 12 \end{pmatrix}$$

$$b_2 = \begin{pmatrix} 4 & 0 & 0 & 12 & 13 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 16 & 0 & 0 & 8 & 6 \\ 6 & 0 & 0 & 5 & 8 \end{pmatrix}$$

The kernel has 1996 orbits on the quadric.

The orbit length are $[4^{1634}, 2^{342}, 1^{20}]$

Induced action on orbit $O_1 = \{2, 97\}$ (length 2)

The induced group has order 2 and is generated by:

g_1 =(1, 2)

g_2 =id

Kernel has order 2 and is generated by:

$$b_1 = \begin{pmatrix} 4 & 0 & 0 & 12 & 13 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 16 & 0 & 0 & 8 & 6 \\ 6 & 0 & 0 & 5 & 8 \end{pmatrix}$$

The kernel has 3801 orbits on the quadric.

The orbit length are $[2^{3439}, 1^{362}]$

Induced action on orbit $O_2 = \{3, 1363\}$ (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 $O_1 = \{2, 3, 4, 5, 13, 14, 15, 16\}$ (length 8)

The induced group has order 8 and is generated by:

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

g_2 =id

g_3 =(1, 7)(2, 6)(3, 5)(4, 8)

g_4 =(1, 5, 8, 2)(3, 7, 6, 4)

Kernel has order 2 and is generated by:

$$b_1 = \begin{pmatrix} 4 & 0 & 0 & 12 & 13 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 16 & 0 & 0 & 8 & 6 \\ 6 & 0 & 0 & 5 & 8 \end{pmatrix}$$

The kernel has 3801 orbits on the quadric.

The orbit length are $[2^{3439}, 1^{362}]$

Induced action on orbit $O_2 = \{3, 1363\}$ (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 $O_2 = \{6, 8, 11, 12, 17, 18, 19, 20\}$ (length 8)

The induced group has order 16 and is generated by:

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

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

g_3 =(1, 4)(2, 3)

g_4 =(1, 5, 4, 8)(2, 7, 3, 6)

Kernel has order 1 and is generated by:

Induced action on orbit $O_3 = \{9, 10\}$ (length 2)

The induced group has order 2 and is generated by:

g_1 =(1, 2)

g_2 =(1, 2)

g_3 =id

g_4 =id

Kernel has order 8 and is generated by:

$$b_1 = \begin{pmatrix} 1 & 3 & 9 & 18 & 8 \\ 14 & 15 & 14 & 11 & 8 \\ 0 & 8 & 15 & 11 & 15 \\ 9 & 13 & 8 & 15 & 13 \\ 0 & 18 & 11 & 3 & 10 \end{pmatrix}$$

$$b_2 = \begin{pmatrix} 4 & 15 & 0 & 12 & 13 \\ 0 & 18 & 0 & 0 & 0 \\ 17 & 12 & 18 & 12 & 7 \\ 16 & 7 & 0 & 8 & 6 \\ 6 & 12 & 0 & 5 & 8 \end{pmatrix}$$

$$b_3 = \begin{pmatrix} 15 & 4 & 0 & 7 & 6 \\ 0 & 1 & 0 & 0 & 0 \\ 2 & 6 & 1 & 1 & 9 \\ 3 & 9 & 0 & 12 & 4 \\ 13 & 1 & 0 & 16 & 12 \end{pmatrix}$$

The kernel has 1004 orbits on the quadric.

The orbit length are $[8^{812}, 4^{181}, 2^9, 1^2]$

Induced action on orbit $O_0 = \{1, 6593\}$ (length 2)

The induced group has order 2 and is generated by:

g_1 =(1, 2)

g_2 =id

g_3 =id

Kernel has order 4 and is generated by:

$$b_1 = \begin{pmatrix} 15 & 4 & 0 & 7 & 6 \\ 0 & 1 & 0 & 0 & 0 \\ 2 & 6 & 1 & 1 & 9 \\ 3 & 9 & 0 & 12 & 4 \\ 13 & 1 & 0 & 16 & 12 \end{pmatrix}$$

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

$$b_3 = \begin{pmatrix} 4 & 15 & 0 & 12 & 13 \\ 0 & 18 & 0 & 0 & 0 \\ 17 & 12 & 18 & 12 & 7 \\ 16 & 7 & 0 & 8 & 6 \\ 6 & 12 & 0 & 5 & 8 \end{pmatrix}$$

The kernel has 1996 orbits on the quadric.

The orbit length are $[4^{1634}, 2^{342}, 1^{20}]$

Induced action on orbit $O_{28} = \{29, 380\}$ (length 2)

The induced group has order 2 and is generated by:

g_1 =id

g_2 =id

g_3 =(1, 2)

Kernel has order 2 and is generated by:

$$b_1 = \begin{pmatrix} 15 & 4 & 0 & 7 & 6 \\ 0 & 1 & 0 & 0 & 0 \\ 2 & 6 & 1 & 1 & 9 \\ 3 & 9 & 0 & 12 & 4 \\ 13 & 1 & 0 & 16 & 12 \end{pmatrix}$$

The kernel has 3801 orbits on the quadric.

The orbit length are $[2^{3439}, 1^{362}]$

Induced action on orbit $O_1 = \{2, 6198\}$ (length 2)

The induced group has order 2 and is generated by:

g_1 =(1, 2)

Kernel has order 1 and is generated by: