

1 BLT set 5 over GF(31)

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

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

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

$$P_3 = (0, 1, 10, 30, 10)$$

$$P_4 = (0, 1, 18, 15, 5)$$

$$P_5 = (0, 1, 8, 10, 24)$$

$$P_6 = (0, 1, 8, 6, 9)$$

$$P_7 = (1, 17, 3, 28, 7)$$

$$P_8 = (1, 21, 23, 12, 1)$$

$$P_9 = (1, 20, 19, 3, 28)$$

$$P_{10} = (1, 25, 25, 10, 18)$$

$$P_{11} = (1, 18, 14, 21, 16)$$

$$P_{12} = (1, 20, 16, 30, 11)$$

$$P_{13} = (1, 16, 2, 20, 3)$$

$$P_{14} = (1, 18, 18, 14, 10)$$

$$P_{15} = (1, 29, 27, 15, 18)$$

$$P_{16} = (1, 11, 6, 8, 11)$$

$$P_{17} = (1, 11, 24, 2, 7)$$

$$P_{18} = (1, 28, 14, 28, 7)$$

$$P_{19} = (1, 16, 20, 7, 25)$$

$$P_{20} = (1, 27, 26, 24, 3)$$

$$P_{21} = (1, 3, 30, 10, 25)$$

$$P_{22} = (1, 22, 21, 19, 5)$$

$$P_{23} = (1, 10, 14, 13, 13)$$

$$P_{24} = (1, 6, 11, 27, 9)$$

$$P_{25} = (1, 25, 25, 20, 9)$$

$$P_{26} = (1, 26, 11, 11, 19)$$

$$P_{27} = (1, 2, 19, 25, 22)$$

$$P_{28} = (1, 20, 18, 12, 19)$$

$$P_{29} = (1, 6, 30, 3, 12)$$

$$P_{30} = (1, 22, 24, 28, 11)$$

$$P_{31} = (1, 24, 23, 4, 9)$$

$$P_{32} = (1, 14, 19, 28, 27)$$

Stabilizer of order 8 is generated by:

$$g_1 = \begin{pmatrix} 10 & 0 & 0 & 24 & 23 \\ 0 & 30 & 0 & 0 & 0 \\ 0 & 27 & 30 & 22 & 28 \\ 27 & 28 & 0 & 11 & 7 \\ 12 & 22 & 0 & 1 & 11 \end{pmatrix}$$

$$g_2 = \begin{pmatrix} 3 & 24 & 1 & 12 & 18 \\ 16 & 11 & 12 & 14 & 21 \\ 12 & 24 & 11 & 21 & 16 \\ 9 & 16 & 21 & 18 & 13 \\ 6 & 21 & 14 & 23 & 18 \end{pmatrix}$$

$$g_3 = \begin{pmatrix} 4 & 9 & 2 & 16 & 27 \\ 1 & 10 & 14 & 13 & 13 \\ 20 & 28 & 10 & 11 & 3 \\ 29 & 3 & 13 & 3 & 27 \\ 8 & 11 & 13 & 24 & 3 \end{pmatrix}$$

Induced action on the BLT-set:

The induced group has order 8 and is generated by:

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

$$g_2 = (1, 30)(2, 27)(3, 17)(4, 21)(5, 29)(6, 11)(7, 9)(8, 10)(12, 20)(13, 22)(14, 28)(15, 16)(18, 26)(24, 32)(25, 31)$$

$$g_3 = (1, 23)(2, 12)(3, 32)(4, 24)(5, 20)(6, 14)(7, 29)(8, 26)(9, 27)(10, 28)(11, 18)(13, 21)(15, 31)(16, 25)(17, 22)(19, 30)$$

Kernel has order 1 and is generated by:

There are 5 orbits on the BLT set.

The orbit length are $[8^3, 4^2]$

The orbits are:

$$O_0 = \{1, 19, 23, 30\} \text{ (length 4)}$$

$$O_1 = \{2, 5, 7, 9, 12, 20, 27, 29\} \text{ (length 8)}$$

$$O_2 = \{3, 4, 13, 17, 21, 22, 24, 32\} \text{ (length 8)}$$

$$O_3 = \{6, 8, 10, 11, 14, 18, 26, 28\} \text{ (length 8)}$$

$$O_4 = \{15, 16, 25, 31\} \text{ (length 4)}$$

The actions induced on the orbits are:

Induced action on orbit $O_0 = \{1, 19, 23, 30\}$ (length 4)

The induced group has order 8 and is generated by:

$$g_1 = (2, 3)$$

$$g_2 = (1, 4)$$

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

Kernel has order 1 and is generated by:

Induced action on orbit $O_1 = \{2, 5, 7, 9, 12, 20, 27, 29\}$ (length 8)

The induced group has order 8 and is generated by:

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

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

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

Kernel has order 1 and is generated by:

Induced action on orbit $O_2 = \{3, 4, 13, 17, 21, 22, 24, 32\}$ (length 8)

The induced group has order 8 and is generated by:

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

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

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

Kernel has order 1 and is generated by:

Induced action on orbit $O_3 = \{6, 8, 10, 11, 14, 18, 26, 28\}$ (length 8)

The induced group has order 8 and is generated by:

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

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

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

Kernel has order 1 and is generated by:

Induced action on orbit $O_4 = \{15, 16, 25, 31\}$ (length 4)

The induced group has order 4 and is generated by:

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

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

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

Kernel has order 2 and is generated by:

$$b_1 = \begin{pmatrix} 12 & 22 & 30 & 27 & 7 \\ 15 & 20 & 19 & 17 & 10 \\ 11 & 4 & 20 & 2 & 8 \\ 19 & 8 & 10 & 21 & 10 \\ 29 & 2 & 17 & 10 & 21 \end{pmatrix}$$

The kernel has 15408 orbits on the quadric.

The orbit length are $[2^{15376}, 1^{32}]$

Induced action on orbit $O_0 = \{1, 18626\}$ (length 2)

The induced group has order 2 and is generated by:

$$g_1 = (1, 2)$$

Kernel has order 1 and is generated by: