

1 BLT set 6 over GF(41)

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

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

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

$$P_3 = (0, 1, 27, 40, 27)$$

$$P_4 = (0, 1, 17, 20, 34)$$

$$P_5 = (0, 1, 22, 4, 15)$$

$$P_6 = (0, 1, 19, 36, 12)$$

$$P_7 = (0, 1, 29, 24, 21)$$

$$P_8 = (1, 30, 33, 8, 35)$$

$$P_9 = (1, 30, 18, 1, 33)$$

$$P_{10} = (0, 1, 38, 2, 22)$$

$$P_{11} = (1, 11, 1, 38, 4)$$

$$P_{12} = (0, 1, 15, 38, 5)$$

$$P_{13} = (1, 5, 3, 13, 24)$$

$$P_{14} = (1, 4, 13, 11, 25)$$

$$P_{15} = (1, 8, 38, 12, 19)$$

$$P_{16} = (1, 23, 3, 30, 25)$$

$$P_{17} = (1, 16, 14, 20, 40)$$

$$P_{18} = (1, 21, 28, 15, 40)$$

$$P_{19} = (1, 17, 8, 15, 10)$$

$$P_{20} = (1, 18, 26, 12, 19)$$

$$P_{21} = (1, 20, 24, 36, 6)$$

$$P_{22} = (0, 1, 27, 16, 6)$$

$$P_{23} = (1, 14, 2, 2, 6)$$

$$P_{24} = (1, 25, 38, 36, 18)$$

$$P_{25} = (1, 36, 27, 18, 12)$$

$$P_{26} = (1, 24, 40, 32, 2)$$

$$P_{27} = (1, 11, 39, 31, 2)$$

$$P_{28} = (1, 37, 17, 15, 40)$$

$$P_{29} = (1, 27, 23, 16, 38)$$

$$P_{30} = (1, 33, 15, 20, 8)$$

$$P_{31} = (1, 37, 15, 21, 36)$$

$$P_{32} = (1, 8, 26, 13, 6)$$

$$P_{33} = (1, 1, 24, 29, 26)$$

$$P_{34} = (1, 7, 16, 27, 11)$$

$$P_{35} = (1, 24, 25, 13, 20)$$

$$P_{36} = (1, 32, 17, 8, 19)$$

$$P_{37} = (1, 17, 21, 37, 28)$$

$$P_{38} = (1, 4, 13, 17, 21)$$

$$P_{39} = (1, 40, 12, 30, 40)$$

$$P_{40} = (1, 34, 20, 34, 27)$$

$$P_{41} = (1, 9, 29, 40, 16)$$

$$P_{42} = (1, 33, 28, 21, 36)$$

Stabilizer of order 24 is generated by:

$$g_1 = \begin{pmatrix} 8 & 0 & 0 & 5 & 12 \\ 0 & 9 & 34 & 36 & 12 \\ 0 & 0 & 32 & 0 & 0 \\ 6 & 0 & 15 & 16 & 8 \\ 23 & 0 & 4 & 31 & 16 \end{pmatrix}$$

$$g_2 = \begin{pmatrix} 39 & 0 & 0 & 3 & 40 \\ 0 & 32 & 0 & 0 & 0 \\ 0 & 35 & 9 & 30 & 10 \\ 20 & 33 & 0 & 21 & 20 \\ 22 & 17 & 0 & 16 & 21 \end{pmatrix}$$

Induced action on the BLT-set:

The induced group has order 24 and is generated by:

$$g_1 = (1, 5, 3, 6)(7, 11, 22, 8)(9, 28, 27, 14)(10, 26, 12, 19)(13, 20, 25, 16)(15, 17, 30, 24)(18, 23, 21, 29)(31, 35, 38, 37)(32, 40, 42, 34)(33, 41, 39, 36)$$

$$g_2 = (2, 6, 4, 5)(7, 20, 12, 30)(8, 14, 19, 18)(9, 25, 29, 17)(10, 16, 22, 15)(11, 21, 26, 28)(13, 27, 24, 23)(31, 33, 32, 36)(34, 37, 35, 40)(38, 41, 42, 39)$$

Kernel has order 1 and is generated by:

There are 3 orbits on the BLT set.

The orbit length are [24, 12, 6]

The orbits are:

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

$$O_1 = \{7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30\} \text{ (length 24)}$$

$$O_2 = \{31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42\} \text{ (length 12)}$$

The actions induced on the orbits are:

Induced action on orbit $O_0 = \{1, 2, 3, 4, 5, 6\}$ (length 6)

The induced group has order 24 and is generated by:

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

$$g_2 = (2, 6, 4, 5)$$

Kernel has order 1 and is generated by:

Induced action on orbit $O_1 = \{7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30\}$ (length 24)

The induced group has order 24 and is generated by:

$$g_1 = (1, 5, 16, 2)(3, 22, 21, 8)(4, 20, 6, 13)(7, 14, 19, 10)(9, 11, 24, 18)(12, 17, 15, 23)$$

$$g_2 = (1, 14, 6, 24)(2, 8, 13, 12)(3, 19, 23, 11)(4, 10, 16, 9)(5, 15, 20, 22)(7, 21, 18, 17)$$

Kernel has order 1 and is generated by:

Induced action on orbit $O_2 = \{31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42\}$ (length 12)

The induced group has order 24 and is generated by:

$$g_1 = (1, 5, 8, 7)(2, 10, 12, 4)(3, 11, 9, 6)$$

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

Kernel has order 1 and is generated by: