1 BLT set 5 over GF(41)

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

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

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

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

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

$P_5 = (0, 1, 29, 35, 39)$

$P_6 = (0, 1, 6, 33, 11)$

$P_7 = (0, 1, 34, 4, 12)$

$P_8 = (1, 26, 9, 18, 12)$

$P_9 = (0, 1, 34, 36, 15)$

$P_{10} = (1, 15, 32, 5, 35)$

$P_{11} = (1, 35, 4, 20, 36)$

$P_{12} = (1, 3, 37, 37, 28)$

$P_{13} = (1, 28, 9, 39, 24)$

$P_{14} = (1, 22, 32, 26, 6)$

$P_{15} = (1, 1, 27, 15, 20)$

$P_{16} = (1, 9, 14, 17, 7)$

$P_{17} = (1, 18, 30, 40, 8)$

$P_{18} = (1, 9, 11, 24, 30)$

$P_{19} = (1, 21, 6, 32, 5)$

$P_{20} = (1, 39, 35, 37, 34)$

$P_{21} = (1, 40, 3, 7, 12)$

$P_{22} = (1, 33, 38, 30, 6)$

$P_{23} = (1, 38, 40, 27, 12)$

$P_{24} = (1, 39, 14, 8, 29)$

$P_{25} = (1, 29, 1, 33, 14)$

$P_{26} = (1, 21, 27, 6, 1)$

$P_{27} = (1, 23, 15, 23, 1)$

$P_{28} = (1, 22, 9, 38, 39)$

$P_{29} = (1, 6, 5, 26, 13)$

$P_{30} = (1, 6, 36, 37, 3)$

$P_{31} = (1, 23, 30, 14, 18)$

$P_{32} = (1, 22, 32, 25, 21)$

$P_{33} = (1, 32, 35, 34, 2)$

$P_{34} = (1, 32, 15, 33, 14)$

$P_{35} = (1, 37, 11, 39, 40)$

$P_{36} = (1, 39, 26, 25, 25)$

$P_{37} = (1, 23, 26, 15, 12)$

$P_{38} = (1, 21, 6, 29, 14)$

$P_{39} = (1, 21, 26, 23, 19)$

$P_{40} = (1, 8, 15, 31, 8)$

$P_{41} = (1, 11, 8, 12, 37)$

$P_{42} = (1, 3, 33, 5, 21)$

Stabilizer of order 8 is generated by:

$$g_1 = \begin{pmatrix} 21 & 0 & 0 & 34 & 16 \\ 0 & 7 & 25 & 34 & 25 \\ 0 & 37 & 7 & 24 & 8 \\ 8 & 8 & 25 & 23 & 1 \\ 17 & 24 & 34 & 9 & 23 \end{pmatrix}$$

$$g_2 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 40 & 0 & 0 & 0 \\ 0 & 12 & 40 & 35 & 39 \\ 0 & 39 & 0 & 1 & 0 \\ 0 & 35 & 0 & 0 & 1 \end{pmatrix}$$

$$g_3 = \begin{pmatrix} 7 & 20 & 0 & 20 & 14 \\ 0 & 9 & 0 & 0 & 0 \\ 10 & 19 & 32 & 1 & 30 \\ 7 & 7 & 0 & 37 & 2 \\ 10 & 14 & 0 & 25 & 37 \end{pmatrix}$$

Induced action on the BLT-set:

The induced group has order 8 and is generated by:

g_1 =(1, 3)(2, 5)(4, 6)(7, 8)(9, 10)(11, 13)(12, 14)(15, 17)(16, 18)(19, 21)(20, 22)(23, 26)(24, 25)(27, 31)(28, 34)(29, 33)(30, 38)(32, 36)(35, 37)(39, 41)(40, 42)

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

g_3 =(2, 30, 4, 29)(5, 33, 6, 38)(7, 27, 9, 37)(8, 35, 10, 31)(11, 40, 12, 39)(13, 41, 14, 42)(15, 36, 16, 34)(17, 28, 18, 32)(19, 23, 20, 25)(21, 24, 22, 26)

Kernel has order 1 and is generated by:

There are 6 orbits on the BLT set.

The orbit length are $[8^5, 2]$

The orbits are:

$O_0 = \{1, 3\}$ (length 2)

$O_1 = \{2, 4, 5, 6, 29, 30, 33, 38\}$ (length 8)

$O_2 = \{7, 8, 9, 10, 27, 31, 35, 37\}$ (length 8)

$O_3 = \{11, 12, 13, 14, 39, 40, 41, 42\}$ (length 8)

$O_4 = \{15, 16, 17, 18, 28, 32, 34, 36\}$ (length 8)

$O_5 = \{19, 20, 21, 22, 23, 24, 25, 26\}$ (length 8)

The actions induced on the orbits are:

Induced action on orbit $O_0 = \{1, 3\}$ (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:

$$b_1 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 40 & 0 & 0 & 0 \\ 0 & 12 & 40 & 35 & 39 \\ 0 & 39 & 0 & 1 & 0 \\ 0 & 35 & 0 & 0 & 1 \end{pmatrix}$$

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

$$b_3 = \begin{pmatrix} 7 & 20 & 0 & 20 & 14 \\ 0 & 32 & 0 & 0 & 0 \\ 10 & 19 & 9 & 14 & 7 \\ 7 & 30 & 0 & 37 & 2 \\ 10 & 1 & 0 & 25 & 37 \end{pmatrix}$$

The kernel has 17674 orbits on the quadric.

The orbit length are $[4^{17650}, 2^{20}, 1^4]$

Induced action on orbit $O_{22} = \{43, 6880\}$ (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:

$$b_1 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 40 & 0 & 0 & 0 \\ 0 & 12 & 40 & 35 & 39 \\ 0 & 39 & 0 & 1 & 0 \\ 0 & 35 & 0 & 0 & 1 \end{pmatrix}$$

The kernel has 35344 orbits on the quadric.

The orbit length are $[2^{35300}, 1^{44}]$

Induced action on orbit $O_1 = \{2, 246\}$ (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 $O_1 = \{2, 4, 5, 6, 29, 30, 33, 38\}$ (length 8)

The induced group has order 8 and is generated by:

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

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

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

Kernel has order 1 and is generated by:

Induced action on orbit $O_2 = \{7, 8, 9, 10, 27, 31, 35, 37\}$ (length 8)

The induced group has order 8 and is generated by:

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

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

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

Kernel has order 1 and is generated by:

Induced action on orbit $O_3 = \{11, 12, 13, 14, 39, 40, 41, 42\}$ (length 8)

The induced group has order 8 and is generated by:

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

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

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

Kernel has order 1 and is generated by:

Induced action on orbit $O_4 = \{15, 16, 17, 18, 28, 32, 34, 36\}$ (length 8)

The induced group has order 8 and is generated by:

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

g_2 =(1, 2)(3, 4)(5, 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 $O_5 = \{19, 20, 21, 22, 23, 24, 25, 26\}$ (length 8)

The induced group has order 8 and is generated by:

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

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

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

Kernel has order 1 and is generated by: