1 BLT set 1 over GF(41)

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

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

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

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

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

$P_5 = (0, 1, 3, 27, 9)$

$P_6 = (0, 1, 35, 10, 17)$

$P_7 = (0, 1, 30, 22, 21)$

$P_8 = (0, 1, 14, 32, 38)$

$P_9 = (0, 1, 12, 28, 23)$

$P_{10} = (0, 1, 28, 11, 31)$

$P_{11} = (0, 1, 7, 26, 36)$

$P_{12} = (0, 1, 29, 6, 2)$

$P_{13} = (0, 1, 26, 2, 28)$

$P_{14} = (0, 1, 15, 18, 6)$

$P_{15} = (0, 1, 34, 12, 4)$

$P_{16} = (0, 1, 30, 19, 20)$

$P_{17} = (0, 1, 26, 39, 13)$

$P_{18} = (0, 1, 34, 29, 37)$

$P_{19} = (0, 1, 19, 5, 29)$

$P_{20} = (0, 1, 35, 31, 24)$

$P_{21} = (0, 1, 13, 24, 8)$

$P_{22} = (0, 1, 15, 23, 35)$

$P_{23} = (0, 1, 11, 34, 25)$

$P_{24} = (0, 1, 17, 21, 7)$

$P_{25} = (0, 1, 12, 13, 18)$

$P_{26} = (0, 1, 24, 16, 19)$

$P_{27} = (0, 1, 14, 9, 3)$

$P_{28} = (0, 1, 6, 33, 11)$

$P_{29} = (0, 1, 22, 37, 26)$

$P_{30} = (0, 1, 38, 38, 40)$

$P_{31} = (0, 1, 6, 8, 30)$

$P_{32} = (0, 1, 27, 1, 14)$

$P_{33} = (0, 1, 28, 30, 10)$

$P_{34} = (0, 1, 7, 15, 5)$

$P_{35} = (0, 1, 22, 4, 15)$

$P_{36} = (0, 1, 11, 7, 16)$

$P_{37} = (0, 1, 13, 17, 33)$

$P_{38} = (0, 1, 19, 36, 12)$

$P_{39} = (0, 1, 29, 35, 39)$

$P_{40} = (0, 1, 3, 14, 32)$

$P_{41} = (0, 1, 24, 25, 22)$

$P_{42} = (0, 1, 38, 3, 1)$

Stabilizer of order 5785920 is generated by:

$$g_1 = \begin{pmatrix} 8 & 0 & 0 & 36 & 29 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 35 & 0 & 0 & 17 & 22 \\ 18 & 0 & 0 & 34 & 17 \end{pmatrix}$$

$$g_2 = \begin{pmatrix} 7 & 0 & 0 & 12 & 37 \\ 0 & 39 & 7 & 1 & 14 \\ 0 & 6 & 39 & 35 & 39 \\ 39 & 39 & 14 & 39 & 29 \\ 6 & 35 & 1 & 15 & 39 \end{pmatrix}$$

$$g_3 = \begin{pmatrix} 35 & 0 & 0 & 33 & 30 \\ 0 & 40 & 0 & 0 & 0 \\ 0 & 0 & 40 & 0 & 0 \\ 15 & 0 & 0 & 23 & 33 \\ 37 & 0 & 0 & 10 & 23 \end{pmatrix}$$

$$g_4 = \begin{pmatrix} 30 & 0 & 0 & 14 & 9 \\ 0 & 40 & 0 & 0 & 0 \\ 0 & 0 & 40 & 0 & 0 \\ 25 & 0 & 0 & 5 & 39 \\ 7 & 0 & 0 & 23 & 5 \end{pmatrix}$$

$$g_5 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 40 & 0 & 0 & 0 \\ 0 & 0 & 40 & 0 & 0 \\ 0 & 0 & 0 & 40 & 0 \\ 0 & 0 & 0 & 0 & 40 \end{pmatrix}$$

$$g_6 = \begin{pmatrix} 4 & 0 & 0 & 39 & 28 \\ 0 & 40 & 0 & 0 & 0 \\ 0 & 7 & 40 & 29 & 37 \\ 14 & 37 & 0 & 19 & 35 \\ 40 & 29 & 0 & 28 & 19 \end{pmatrix}$$

$$g_7 = \begin{pmatrix} 31 & 0 & 0 & 25 & 19 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 14 & 1 & 9 & 3 \\ 30 & 3 & 0 & 25 & 5 \\ 33 & 9 & 0 & 4 & 25 \end{pmatrix}$$

$$g_8 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 9 & 0 & 0 & 0 \\ 0 & 0 & 32 & 0 & 0 \\ 0 & 0 & 0 & 40 & 0 \\ 0 & 0 & 0 & 0 & 40 \end{pmatrix}$$

$$g_9 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 36 & 0 & 0 & 0 \\ 0 & 0 & 8 & 0 & 0 \\ 0 & 0 & 0 & 40 & 0 \\ 0 & 0 & 0 & 0 & 40 \end{pmatrix}$$

$$g_{10} = \begin{pmatrix} 40 & 0 & 0 & 0 & 0 \\ 0 & 12 & 0 & 0 & 0 \\ 0 & 0 & 24 & 0 & 0 \\ 0 & 0 & 0 & 40 & 0 \\ 0 & 0 & 0 & 0 & 40 \end{pmatrix}$$

Induced action on the BLT-set:

The induced group has order 68880 and is generated by:

g_1 =id

g_2 =(1, 4)(2, 3)(5, 6)(7, 8)(11, 14)(12, 13)(15, 18)(16, 17)(19, 22)(20, 21)(23, 26)(24, 25)(27, 30)(28, 29)(31, 34)(32, 33)(35, 38)(36, 37)(39, 42)(40, 41)

g_3 =id

g_4 =id

g_5 =id

g_6 =(2, 6)(3, 5)(7, 8)(9, 10)(11, 12)(13, 14)(15, 16)(17, 18)(19, 20)(21, 22)(23, 24)(25, 26)(27, 28)(29, 30)(31, 32)(33, 34)(35, 36)(37, 38)(39, 40)(41, 42)

g_7 =(2, 5)(3, 4)(6, 32)(7, 29)(8, 37)(9, 14)(10, 41)(11, 38)(12, 35)(13, 18)(15, 42)(16, 22)(17, 26)(19, 28)(20, 39)(21, 33)(23, 40)(24, 31)(27, 36)(30, 34)

g_8 =(3, 8, 32, 27)(4, 26, 24, 41)(5, 30, 40, 42)(6, 31, 20, 28)(7, 23, 16, 36)(9, 12, 25, 39)(10, 37,

33, 21)(11, 18, 34, 15)(13, 14, 17, 22)(19, 35, 38, 29)

g_9 =(3, 31, 14, 4, 35, 27, 6, 13, 41, 19, 32, 28, 22, 24, 29, 8, 20, 17, 26, 38)(5, 33, 12, 23, 34, 42, 37, 9, 7, 18, 40, 10, 39, 36, 11, 30, 21, 25, 16, 15)

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

Kernel has order 84 and is generated by:

$$b_1 = \begin{pmatrix} 7 & 0 & 0 & 12 & 37 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 2 & 0 & 0 & 4 & 40 \\ 35 & 0 & 0 & 32 & 4 \end{pmatrix}$$

$$b_2 = \begin{pmatrix} 30 & 0 & 0 & 14 & 9 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 16 & 0 & 0 & 36 & 2 \\ 34 & 0 & 0 & 18 & 36 \end{pmatrix}$$

$$b_3 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 40 & 0 & 0 & 0 \\ 0 & 0 & 40 & 0 & 0 \\ 0 & 0 & 0 & 40 & 0 \\ 0 & 0 & 0 & 0 & 40 \end{pmatrix}$$

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

$$b_5 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{pmatrix}$$

$$b_6 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{pmatrix}$$

$$b_7 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{pmatrix}$$

$$b_8 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{pmatrix}$$

$$b_9 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{pmatrix}$$

$$b_{10} = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{pmatrix}$$

$$b_{11} = \begin{pmatrix} 15 & 0 & 0 & 4 & 26 \\ 0 & 40 & 0 & 0 & 0 \\ 0 & 0 & 40 & 0 & 0 \\ 28 & 0 & 0 & 7 & 11 \\ 39 & 0 & 0 & 17 & 7 \end{pmatrix}$$

The kernel has 1723 orbits on the quadric.

The orbit length are $[42^{1681}, 1^{42}]$

Induced action on orbit $O_2 = \{3, 84, 5005, 5086, 5167, 5248, 5329, 5410, 5491, 5572, 5653, 5734, 5815, 5896, 5977, 6$
(length 42)

The induced group has order 84 and is generated by:

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

g_2 =(1, 10, 19, 42, 13, 37, 41, 34, 30, 14, 9, 36, 31, 15, 11, 4, 8, 32, 3, 26, 35)(2, 28, 7, 40, 6, 22, 21, 29, 27, 33, 20, 25, 12, 18, 16, 24, 23, 39, 5, 38, 17)

g_3 =(3, 42)(4, 41)(5, 40)(6, 39)(7, 38)(8, 37)(9, 36)(10, 35)(11, 34)(12, 33)(13, 32)(14, 31)(15, 30)(16, 29)(17, 28)(18, 27)(19, 26)(20, 25)(21, 24)(22, 23)

g_4 =id

g_5 =id

g_6 =id

g_7 =id

g_8 =id

g_9 =id

g_{10} =id

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

Kernel has order 1 and is generated by:

There are 1 orbits on the BLT set.

The orbit length are [42]

The orbits are:

$O_0 = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34,$
(length 42)