

# 1 BLT set 3 over GF(43)

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

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

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

$$P_3 = (0, 1, 21, 42, 21)$$

$$P_4 = (0, 1, 16, 21, 32)$$

$$P_5 = (0, 1, 31, 14, 7)$$

$$P_6 = (0, 1, 21, 25, 37)$$

$$P_7 = (1, 16, 36, 14, 11)$$

$$P_8 = (1, 23, 16, 26, 4)$$

$$P_9 = (1, 17, 35, 4, 23)$$

$$P_{10} = (1, 28, 39, 31, 23)$$

$$P_{11} = (1, 36, 24, 32, 20)$$

$$P_{12} = (1, 34, 18, 30, 24)$$

$$P_{13} = (1, 10, 13, 20, 30)$$

$$P_{14} = (1, 21, 9, 30, 8)$$

$$P_{15} = (1, 9, 4, 2, 3)$$

$$P_{16} = (1, 39, 37, 26, 4)$$

$$P_{17} = (1, 33, 5, 4, 23)$$

$$P_{18} = (1, 34, 39, 18, 29)$$

$$P_{19} = (1, 28, 18, 26, 12)$$

$$P_{20} = (1, 19, 26, 4, 16)$$

$$P_{21} = (1, 42, 5, 34, 33)$$

$$P_{22} = (1, 7, 28, 38, 5)$$

$$P_{23} = (1, 2, 42, 29, 3)$$

$$P_{24} = (1, 28, 26, 16, 27)$$

$$P_{25} = (1, 12, 3, 35, 10)$$

$$P_{26} = (1, 13, 41, 27, 28)$$

$$P_{27} = (1, 5, 33, 22, 12)$$

$$P_{28} = (1, 6, 35, 15, 6)$$

$$P_{29} = (0, 1, 15, 27, 9)$$

$$P_{30} = (1, 35, 17, 6, 1)$$

$$P_{31} = (1, 10, 40, 9, 8)$$

$$P_{32} = (1, 10, 21, 5, 18)$$

$$P_{33} = (1, 26, 7, 8, 4)$$

$$P_{34} = (1, 12, 42, 20, 7)$$

$$P_{35} = (1, 15, 1, 39, 4)$$

$$P_{36} = (1, 29, 32, 2, 30)$$

$$P_{37} = (1, 3, 30, 13, 36)$$

$$P_{38} = (1, 5, 34, 5, 26)$$

$$P_{39} = (1, 16, 13, 22, 12)$$

$$P_{40} = (1, 13, 9, 21, 21)$$

$$P_{41} = (1, 38, 24, 3, 11)$$

$$P_{42} = (1, 24, 23, 23, 4)$$

$$P_{43} = (1, 24, 21, 37, 34)$$

$$P_{44} = (1, 19, 20, 35, 10)$$

Stabilizer of order 2 is generated by:

$$g_1 = \begin{pmatrix} 30 & 0 & 19 & 18 & 5 \\ 31 & 39 & 3 & 19 & 27 \\ 0 & 29 & 39 & 19 & 31 \\ 24 & 31 & 27 & 10 & 35 \\ 9 & 19 & 19 & 16 & 10 \end{pmatrix}$$

The induced group has order 2 and is generated by:

$$g_1 = (1, 36)(2, 5)(3, 10)(4, 22)(6, 26)(7, 38)(8, 40)(9, 29)(11, 43)(13, 17)(14, 27)(15, 18)(16, 21)(19, 33)(20, 25)(23, 30)(24, 37)(28, 32)(31, 35)(39, 44)(41, 42)$$

group order is small, so we list all elements  $a_1 = \text{id}$

$a_2 = (1, 36)(2, 5)(3, 10)(4, 22)(6, 26)(7, 38)(8, 40)(9, 29)(11, 43)(13, 17)(14, 27)(15, 18)(16, 21)(19, 33)(20, 25)(23, 30)(24, 37)(28, 32)(31, 35)(39, 44)(41, 42)$

and now the elements themselves:  $a_1 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{pmatrix}$

$a_2 = \begin{pmatrix} 30 & 0 & 19 & 18 & 5 \\ 31 & 39 & 3 & 19 & 27 \\ 0 & 29 & 39 & 19 & 31 \\ 24 & 31 & 27 & 10 & 35 \\ 9 & 19 & 19 & 16 & 10 \end{pmatrix}$

Kernel has order 1 and is generated by:

There are 23 orbits on the BLT set.

The orbit length are  $[2^{21}, 1^2]$

The orbits are:

$O_0 = \{1, 36\}$  (length 2)

$O_1 = \{2, 5\}$  (length 2)

$O_2 = \{3, 10\}$  (length 2)

$O_3 = \{4, 22\}$  (length 2)

$O_4 = \{6, 26\}$  (length 2)

$O_5 = \{7, 38\}$  (length 2)

$O_6 = \{8, 40\}$  (length 2)

$O_7 = \{9, 29\}$  (length 2)

$O_8 = \{11, 43\}$  (length 2)

$O_9 = \{12\}$  (length 1)

$O_{10} = \{13, 17\}$  (length 2)

$O_{11} = \{14, 27\}$  (length 2)

$$O_{12} = \{15, 18\} \text{ (length 2)}$$

$$O_{13} = \{16, 21\} \text{ (length 2)}$$

$$O_{14} = \{19, 33\} \text{ (length 2)}$$

$$O_{15} = \{20, 25\} \text{ (length 2)}$$

$$O_{16} = \{23, 30\} \text{ (length 2)}$$

$$O_{17} = \{24, 37\} \text{ (length 2)}$$

$$O_{18} = \{28, 32\} \text{ (length 2)}$$

$$O_{19} = \{31, 35\} \text{ (length 2)}$$

$$O_{20} = \{34\} \text{ (length 1)}$$

$$O_{21} = \{39, 44\} \text{ (length 2)}$$

$$O_{22} = \{41, 42\} \text{ (length 2)}$$

The actions induced on the orbits are:

Induced action on orbit  $O_0 = \{1, 36\}$  (length 2)

The induced group has order 2 and is generated by:

$$g_1 = (1, 2)$$

group order is small, so we list all elements  $a_1 = \text{id}$

$$a_2 = (1, 2)$$

and now the elements themselves:  $a_1 =$

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

$$a_2 = \begin{pmatrix} 30 & 0 & 19 & 18 & 5 \\ 31 & 39 & 3 & 19 & 27 \\ 0 & 29 & 39 & 19 & 31 \\ 24 & 31 & 27 & 10 & 35 \\ 9 & 19 & 19 & 16 & 10 \end{pmatrix}$$

Kernel has order 1 and is generated by:

Induced action on orbit  $O_1 = \{2, 5\}$  (length 2)

The induced group has order 2 and is generated by:

$$g_1 = (1, 2)$$

group order is small, so we list all elements  $a_1 = \text{id}$

$$a_2 = (1, 2)$$

and now the elements themselves:  $a_1 =$

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

$$a_2 = \begin{pmatrix} 30 & 0 & 19 & 18 & 5 \\ 31 & 39 & 3 & 19 & 27 \\ 0 & 29 & 39 & 19 & 31 \\ 24 & 31 & 27 & 10 & 35 \\ 9 & 19 & 19 & 16 & 10 \end{pmatrix}$$

Kernel has order 1 and is generated by:

Induced action on orbit  $O_2 = \{3, 10\}$  (length 2)

The induced group has order 2 and is generated by:

$$g_1 = (1, 2)$$

group order is small, so we list all elements  $a_1 = \text{id}$

$$a_2 = (1, 2)$$

and now the elements themselves:  $a_1 =$

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

$$a_2 = \begin{pmatrix} 30 & 0 & 19 & 18 & 5 \\ 31 & 39 & 3 & 19 & 27 \\ 0 & 29 & 39 & 19 & 31 \\ 24 & 31 & 27 & 10 & 35 \\ 9 & 19 & 19 & 16 & 10 \end{pmatrix}$$

Kernel has order 1 and is generated by:

Induced action on orbit  $O_3 = \{4, 22\}$  (length 2)

The induced group has order 2 and is generated by:

$$g_1 = (1, 2)$$

group order is small, so we list all elements  $a_1 = \text{id}$

$$a_2 = (1, 2)$$

and now the elements themselves:  $a_1 =$

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

$$a_2 = \begin{pmatrix} 30 & 0 & 19 & 18 & 5 \\ 31 & 39 & 3 & 19 & 27 \\ 0 & 29 & 39 & 19 & 31 \\ 24 & 31 & 27 & 10 & 35 \\ 9 & 19 & 19 & 16 & 10 \end{pmatrix}$$

Kernel has order 1 and is generated by:

Induced action on orbit  $O_4 = \{6, 26\}$  (length 2)

The induced group has order 2 and is generated by:

$$g_1 = (1, 2)$$

group order is small, so we list all elements  $a_1 = \text{id}$

$$a_2 = (1, 2)$$

and now the elements themselves:  $a_1 =$

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

$$a_2 = \begin{pmatrix} 30 & 0 & 19 & 18 & 5 \\ 31 & 39 & 3 & 19 & 27 \\ 0 & 29 & 39 & 19 & 31 \\ 24 & 31 & 27 & 10 & 35 \\ 9 & 19 & 19 & 16 & 10 \end{pmatrix}$$

Kernel has order 1 and is generated by:

Induced action on orbit  $O_5 = \{7, 38\}$  (length 2)

The induced group has order 2 and is generated by:

$$g_1 = (1, 2)$$

group order is small, so we list all elements  $a_1 = \text{id}$

$$a_2 = (1, 2)$$

and now the elements themselves:  $a_1 =$

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

$$a_2 = \begin{pmatrix} 30 & 0 & 19 & 18 & 5 \\ 31 & 39 & 3 & 19 & 27 \\ 0 & 29 & 39 & 19 & 31 \\ 24 & 31 & 27 & 10 & 35 \\ 9 & 19 & 19 & 16 & 10 \end{pmatrix}$$

Kernel has order 1 and is generated by:

Induced action on orbit  $O_6 = \{8, 40\}$  (length 2)

The induced group has order 2 and is generated by:

$$g_1 = (1, 2)$$

group order is small, so we list all elements  $a_1 = \text{id}$

$$a_2 = (1, 2)$$

and now the elements themselves:  $a_1 =$

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

$$a_2 = \begin{pmatrix} 30 & 0 & 19 & 18 & 5 \\ 31 & 39 & 3 & 19 & 27 \\ 0 & 29 & 39 & 19 & 31 \\ 24 & 31 & 27 & 10 & 35 \\ 9 & 19 & 19 & 16 & 10 \end{pmatrix}$$

Kernel has order 1 and is generated by:

Induced action on orbit  $O_7 = \{9, 29\}$  (length 2)

The induced group has order 2 and is generated by:

$$g_1 = (1, 2)$$

group order is small, so we list all elements  $a_1 = \text{id}$

$$a_2 = (1, 2)$$

and now the elements themselves:  $a_1 =$

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

$$a_2 = \begin{pmatrix} 30 & 0 & 19 & 18 & 5 \\ 31 & 39 & 3 & 19 & 27 \\ 0 & 29 & 39 & 19 & 31 \\ 24 & 31 & 27 & 10 & 35 \\ 9 & 19 & 19 & 16 & 10 \end{pmatrix}$$

Kernel has order 1 and is generated by:

Induced action on orbit  $O_8 = \{11, 43\}$  (length 2)

The induced group has order 2 and is generated by:

$$g_1 = (1, 2)$$

group order is small, so we list all elements  $a_1 = \text{id}$

$$a_2 = (1, 2)$$

and now the elements themselves:  $a_1 =$

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

$$a_2 = \begin{pmatrix} 30 & 0 & 19 & 18 & 5 \\ 31 & 39 & 3 & 19 & 27 \\ 0 & 29 & 39 & 19 & 31 \\ 24 & 31 & 27 & 10 & 35 \\ 9 & 19 & 19 & 16 & 10 \end{pmatrix}$$

Kernel has order 1 and is generated by:

Induced action on orbit  $O_9 = \{12\}$  (length 1)

The induced group has order 1 and is generated by:

$$g_1 = \text{id}$$

group order is small, so we list all elements  $a_1 = \text{id}$

and now the elements themselves:  $a_1 =$

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

Kernel has order 2 and is generated by:

$$b_1 = \begin{pmatrix} 30 & 0 & 19 & 18 & 5 \\ 31 & 39 & 3 & 19 & 27 \\ 0 & 29 & 39 & 19 & 31 \\ 24 & 31 & 27 & 10 & 35 \\ 9 & 19 & 19 & 16 & 10 \end{pmatrix}$$

The kernel has 40722 orbits on the quadric.

The orbit length are  $[2^{40678}, 1^{44}]$

Induced action on orbit  $O_{10} = \{13, 17\}$  (length 2)

The induced group has order 2 and is generated by:

$$g_1 = (1, 2)$$

group order is small, so we list all elements  $a_1 = \text{id}$

$$a_2 = (1, 2)$$

and now the elements themselves:  $a_1 =$

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

$$a_2 = \begin{pmatrix} 30 & 0 & 19 & 18 & 5 \\ 31 & 39 & 3 & 19 & 27 \\ 0 & 29 & 39 & 19 & 31 \\ 24 & 31 & 27 & 10 & 35 \\ 9 & 19 & 19 & 16 & 10 \end{pmatrix}$$

Kernel has order 1 and is generated by:

Induced action on orbit  $O_{11} = \{14, 27\}$  (length 2)

The induced group has order 2 and is generated by:

$$g_1 = (1, 2)$$

group order is small, so we list all elements  $a_1 = \text{id}$

$$a_2 = (1, 2)$$

and now the elements themselves:  $a_1 =$

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

$$a_2 = \begin{pmatrix} 30 & 0 & 19 & 18 & 5 \\ 31 & 39 & 3 & 19 & 27 \\ 0 & 29 & 39 & 19 & 31 \\ 24 & 31 & 27 & 10 & 35 \\ 9 & 19 & 19 & 16 & 10 \end{pmatrix}$$

Kernel has order 1 and is generated by:

Induced action on orbit  $O_{12} = \{15, 18\}$  (length 2)

The induced group has order 2 and is generated by:

$$g_1 = (1, 2)$$

group order is small, so we list all elements  $a_1 = \text{id}$

$$a_2 = (1, 2)$$

and now the elements themselves:  $a_1 =$

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

$$a_2 = \begin{pmatrix} 30 & 0 & 19 & 18 & 5 \\ 31 & 39 & 3 & 19 & 27 \\ 0 & 29 & 39 & 19 & 31 \\ 24 & 31 & 27 & 10 & 35 \\ 9 & 19 & 19 & 16 & 10 \end{pmatrix}$$

Kernel has order 1 and is generated by:

Induced action on orbit  $O_{13} = \{16, 21\}$  (length 2)

The induced group has order 2 and is generated by:

$$g_1 = (1, 2)$$

group order is small, so we list all elements  $a_1 = \text{id}$

$$a_2 = (1, 2)$$

and now the elements themselves:  $a_1 =$

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

$$a_2 = \begin{pmatrix} 30 & 0 & 19 & 18 & 5 \\ 31 & 39 & 3 & 19 & 27 \\ 0 & 29 & 39 & 19 & 31 \\ 24 & 31 & 27 & 10 & 35 \\ 9 & 19 & 19 & 16 & 10 \end{pmatrix}$$

Kernel has order 1 and is generated by:

Induced action on orbit  $O_{14} = \{19, 33\}$  (length 2)

The induced group has order 2 and is generated by:

$$g_1 = (1, 2)$$

group order is small, so we list all elements  $a_1 = \text{id}$

$$a_2 = (1, 2)$$

and now the elements themselves:  $a_1 =$

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

$$a_2 = \begin{pmatrix} 30 & 0 & 19 & 18 & 5 \\ 31 & 39 & 3 & 19 & 27 \\ 0 & 29 & 39 & 19 & 31 \\ 24 & 31 & 27 & 10 & 35 \\ 9 & 19 & 19 & 16 & 10 \end{pmatrix}$$

Kernel has order 1 and is generated by:

Induced action on orbit  $O_{15} = \{20, 25\}$  (length 2)

The induced group has order 2 and is generated by:

$$g_1 = (1, 2)$$

group order is small, so we list all elements  $a_1 = \text{id}$

$$a_2 = (1, 2)$$

and now the elements themselves:  $a_1 =$

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

$$a_2 = \begin{pmatrix} 30 & 0 & 19 & 18 & 5 \\ 31 & 39 & 3 & 19 & 27 \\ 0 & 29 & 39 & 19 & 31 \\ 24 & 31 & 27 & 10 & 35 \\ 9 & 19 & 19 & 16 & 10 \end{pmatrix}$$

Kernel has order 1 and is generated by:

Induced action on orbit  $O_{16} = \{23, 30\}$  (length 2)

The induced group has order 2 and is generated by:

$$g_1 = (1, 2)$$

group order is small, so we list all elements  $a_1 = \text{id}$

$$a_2 = (1, 2)$$

and now the elements themselves:  $a_1 =$

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

$$a_2 = \begin{pmatrix} 30 & 0 & 19 & 18 & 5 \\ 31 & 39 & 3 & 19 & 27 \\ 0 & 29 & 39 & 19 & 31 \\ 24 & 31 & 27 & 10 & 35 \\ 9 & 19 & 19 & 16 & 10 \end{pmatrix}$$

Kernel has order 1 and is generated by:

Induced action on orbit  $O_{17} = \{24, 37\}$  (length 2)

The induced group has order 2 and is generated by:

$$g_1 = (1, 2)$$

group order is small, so we list all elements  $a_1 = \text{id}$

$$a_2 = (1, 2)$$

and now the elements themselves:  $a_1 =$

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

$$a_2 = \begin{pmatrix} 30 & 0 & 19 & 18 & 5 \\ 31 & 39 & 3 & 19 & 27 \\ 0 & 29 & 39 & 19 & 31 \\ 24 & 31 & 27 & 10 & 35 \\ 9 & 19 & 19 & 16 & 10 \end{pmatrix}$$

Kernel has order 1 and is generated by:

Induced action on orbit  $O_{18} = \{28, 32\}$  (length 2)

The induced group has order 2 and is generated by:

$$g_1 = (1, 2)$$

group order is small, so we list all elements  $a_1 = \text{id}$

$$a_2 = (1, 2)$$

and now the elements themselves:  $a_1 =$

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

$$a_2 = \begin{pmatrix} 30 & 0 & 19 & 18 & 5 \\ 31 & 39 & 3 & 19 & 27 \\ 0 & 29 & 39 & 19 & 31 \\ 24 & 31 & 27 & 10 & 35 \\ 9 & 19 & 19 & 16 & 10 \end{pmatrix}$$

Kernel has order 1 and is generated by:

Induced action on orbit  $O_{19} = \{31, 35\}$  (length 2)

The induced group has order 2 and is generated by:

$$g_1 = (1, 2)$$

group order is small, so we list all elements  $a_1 = \text{id}$

$$a_2 = (1, 2)$$

and now the elements themselves:  $a_1 =$

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

$$a_2 = \begin{pmatrix} 30 & 0 & 19 & 18 & 5 \\ 31 & 39 & 3 & 19 & 27 \\ 0 & 29 & 39 & 19 & 31 \\ 24 & 31 & 27 & 10 & 35 \\ 9 & 19 & 19 & 16 & 10 \end{pmatrix}$$

Kernel has order 1 and is generated by:

Induced action on orbit  $O_{20} = \{34\}$  (length 1)

The induced group has order 1 and is generated by:

$$g_1 = \text{id}$$

group order is small, so we list all elements  $a_1 = \text{id}$

and now the elements themselves:  $a_1 =$

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

Kernel has order 2 and is generated by:

$$b_1 = \begin{pmatrix} 30 & 0 & 19 & 18 & 5 \\ 31 & 39 & 3 & 19 & 27 \\ 0 & 29 & 39 & 19 & 31 \\ 24 & 31 & 27 & 10 & 35 \\ 9 & 19 & 19 & 16 & 10 \end{pmatrix}$$

The kernel has 40722 orbits on the quadric.

The orbit length are  $[2^{40678}, 1^{44}]$

Induced action on orbit  $O_{21} = \{39, 44\}$  (length 2)

The induced group has order 2 and is generated by:

$$g_1 = (1, 2)$$

group order is small, so we list all elements  $a_1 = \text{id}$

$$a_2 = (1, 2)$$

and now the elements themselves:  $a_1 =$

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

$$a_2 = \begin{pmatrix} 30 & 0 & 19 & 18 & 5 \\ 31 & 39 & 3 & 19 & 27 \\ 0 & 29 & 39 & 19 & 31 \\ 24 & 31 & 27 & 10 & 35 \\ 9 & 19 & 19 & 16 & 10 \end{pmatrix}$$

Kernel has order 1 and is generated by:

Induced action on orbit  $O_{22} = \{41, 42\}$  (length 2)

The induced group has order 2 and is generated by:

$$g_1 = (1, 2)$$

group order is small, so we list all elements  $a_1 = \text{id}$

$$a_2 = (1, 2)$$

and now the elements themselves:  $a_1 =$

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

$$a_2 = \begin{pmatrix} 30 & 0 & 19 & 18 & 5 \\ 31 & 39 & 3 & 19 & 27 \\ 0 & 29 & 39 & 19 & 31 \\ 24 & 31 & 27 & 10 & 35 \\ 9 & 19 & 19 & 16 & 10 \end{pmatrix}$$

Kernel has order 1 and is generated by: