AUTOMORPHISM GROUPS OF COMPLEX ELLIPTIC $K3$ SURFACES WITH PICARD NUMBER 3

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This is an extended version of Section 6 of the paper:

I. Shimada. An algorithm to compute automorphism groups of $K3$ surfaces. arXiv:1304.7427.

Let X denote a complex $K3$ surface X whose Néron-Severi lattice S_X has the Gram matrix

$$\begin{bmatrix} 0 & 1 & 0 \\ 1 & -2 & 0 \\ 0 & 0 & -2k \end{bmatrix},$$

and whose period is sufficiently general. We compute the automorphism group of X for $k = 2, \ldots, 15$. The natural homomorphism $\mathrm{Aut}(X) \to \mathrm{O}(S_X)$ is injective. The image contains

$$h_1 := \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & -1 \end{bmatrix}, \quad h_2 := \begin{bmatrix} 1 & 0 & 0 \\ k & 1 & -1 \\ 2k & 0 & -1 \end{bmatrix}.$$

We present a set of elements of $\mathrm{O}(S_X)$ that generate the image as $h_1, h_2, \ldots, h_m$. The elements $h_3, \ldots, h_m$ are called *extra automorphisms*. We also illustrate a decomposition of the fundamental domain of the action of $\mathrm{Aut}(X)$ on the nef cone of X into a union of induced chambers D_i, give the walls of these induced chambers, and present thier adjacency relations. See Section 6 of the paper above for more explanations.

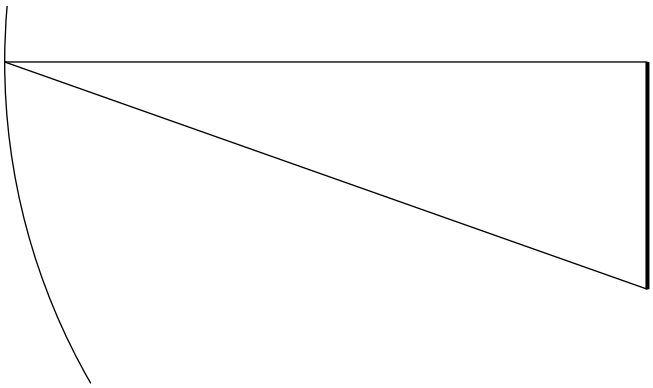

FIGURE 2. Fundamental domain for $-2k = -4$

no extra automorphisms

$$\begin{array}{lll} D_0 & (1,-2,0) & (-2)\text{-wall} \\ & (0,1,2) & \cong D_0 \text{ by } h_2 \\ & (0,0,-1) & \cong D_0 \text{ by } h_1 \end{array}$$

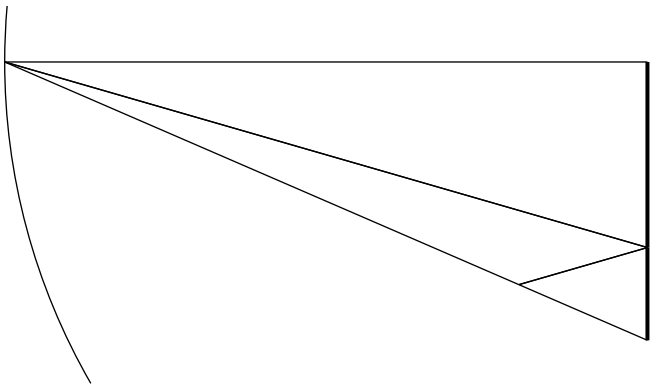

FIGURE 3. Fundamental domain for $-2k = -6$

no extra automorphisms

D_0	$(1,-2,0)$	(-2)-wall	D_1	$(1,-1,3)$	D_2	D_2	$(1,-2,0)$	(-2)-wall
	$(0,1,3)$	D_1		$(0,1,2)$	$\cong D_1$ by h_2		$(0,1,2)$	$\cong D_2$ by h_2
	$(0,0,-1)$	$\cong D_0$ by h_1		$(0,-1,-3)$	D_0		$(-1,1,-3)$	D_1

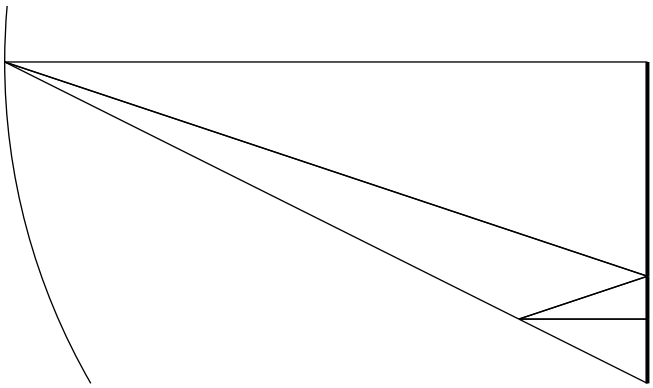

FIGURE 4. Fundamental domain for $-2k = -8$

no extra automorphisms

D_0	$(1,-2,0)$	(-2)-wall	D_1	$(1,-1,3)$	D_2	D_2	$(1,-2,0)$	(-2)-wall
	$(0,1,3)$	D_1		$(0,1,2)$	$\cong D_1$ by h_2		$(-1,1,-3)$	D_1
	$(0,0,-1)$	$\cong D_0$ by h_1		$(0,-1,-3)$	D_0		$(1,0,5)$	D_3

D_3	$(1,-2,0)$	(-2)-wall
	$(0,1,2)$	$\cong D_3$ by h_2
	$(-1,0,-5)$	D_2

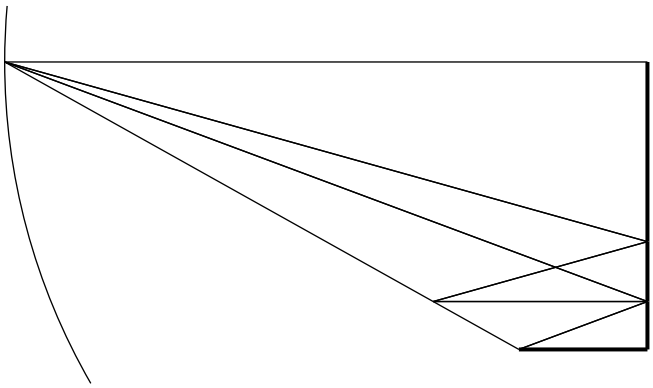

FIGURE 5. Fundamental domain for $-2k = -10$

no extra automorphisms

D_0	$(1,-2,0)$	(-2)-wall	D_1	$(1,-1,4)$	D_2	D_2	$(1,-2,0)$	(-2)-wall
	$(0,1,4)$	D_1		$(0,1,3)$	D_3		$(0,1,3)$	D_4
	$(0,0,-1)$	$\cong D_0$ by h_1		$(0,-1,-4)$	D_0		$(-1,1,-4)$	D_1
D_3	$(1,-1,4)$	D_4	D_4	$(1,0,6)$	D_5	D_5	$(-1,0,-6)$	D_4
	$(0,1,2)$	$\cong D_3$ by h_2		$(0,-1,-3)$	D_2		$(0,1,2)$	$\cong D_5$ by h_2
	$(0,-1,-3)$	D_1		$(-1,1,-4)$	D_3		$(1,-1,3)$	D_6
D_6	$(1,-2,0)$	(-2)-wall						
	$(-1,1,-3)$	D_5						
	$(1,0,5)$	(-2)-wall						

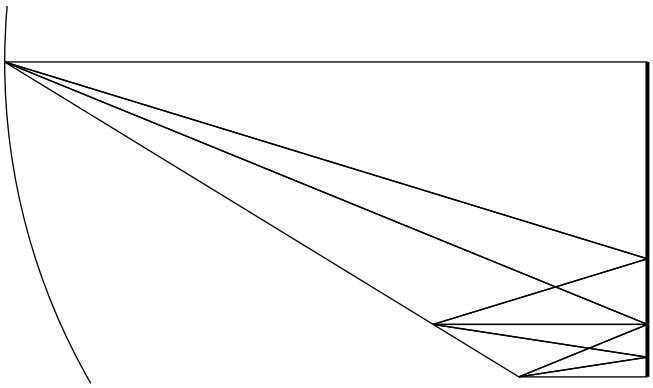

FIGURE 6. Fundamental domain for $-2k = -12$

$$h_3 \;=\; [[49, 24, -10], [0, 1, 0], [240, 120, -49]]$$

D_0	$(1,-2,0)$	(-2)-wall	D_1	$(1,-1,4)$	D_2	D_2	$(1,-2,0)$	(-2)-wall
	$(0,1,4)$	D_1		$(0,1,3)$	D_3		$(0,1,3)$	D_4
	$(0,0,-1)$	$\cong D_0$ by h_1		$(0,-1,-4)$	D_0		$(-1,1,-4)$	D_1
D_3	$(1,-1,4)$	D_4	D_4	$(1,0,6)$	D_5	D_5	$(1,1,8)$	D_6
	$(0,1,2)$	$\cong D_3$ by h_2		$(0,-1,-3)$	D_2		$(1,-1,3)$	D_7
	$(0,-1,-3)$	D_1		$(-1,1,-4)$	D_3		$(-1,0,-6)$	D_4
D_6	$(-1,-1,-8)$	D_5	D_7	$(1,-2,0)$	(-2)-wall	D_8	$(2,-1,8)$	D_9
	$(0,1,2)$	$\cong D_6$ by h_2		$(-1,1,-3)$	D_5		$(-1,1,-3)$	D_6
	$(1,-1,3)$	D_8		$(1,1,8)$	D_8		$(-1,-1,-8)$	D_7
D_9	$(1,-2,0)$	(-2)-wall						
	$(1,0,5)$	$\cong D_9$ by h_3						
	$(-2,1,-8)$	D_8						

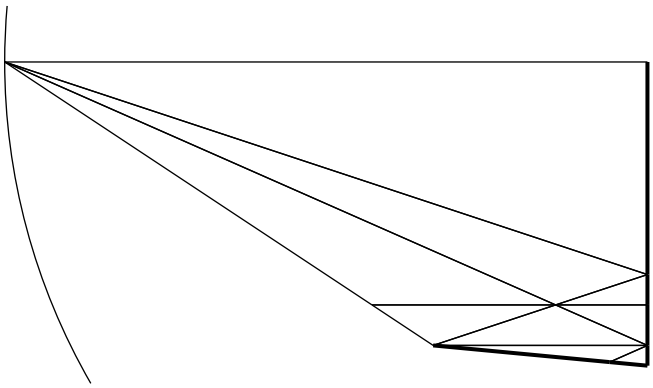

FIGURE 7. Fundamental domain for $-2k = -14$

no extra automorphisms

D_0	$(1,-2,0)$	(-2)-wall	D_1	$(1,-1,4)$	D_2	D_2	$(1,-2,0)$	(-2)-wall
	$(0,1,4)$	D_1		$(0,1,3)$	D_3		$(1,0,7)$	D_4
	$(0,0,-1)$	$\cong D_0$ by h_1		$(0,-1,-4)$	D_0		$(-1,1,-4)$	D_1
D_3	$(0,-1,-3)$	D_1	D_4	$(1,-2,0)$	(-2)-wall	D_5	$(1,-1,4)$	D_6
	$(1,0,7)$	D_5		$(-1,0,-7)$	D_2		$(-1,0,-7)$	D_3
	$(0,1,2)$	$\cong D_3$ by h_2		$(0,1,3)$	D_6		$(0,1,2)$	$\cong D_5$ by h_2
D_6	$(1,0,6)$	D_7	D_7	$(-1,0,-6)$	D_6	D_8	$(1,-2,0)$	(-2)-wall
	$(0,-1,-3)$	D_4		$(2,1,14)$	(-2)-wall		$(2,1,14)$	(-2)-wall
	$(-1,1,-4)$	D_5		$(1,-1,3)$	D_8		$(-1,1,-3)$	D_7

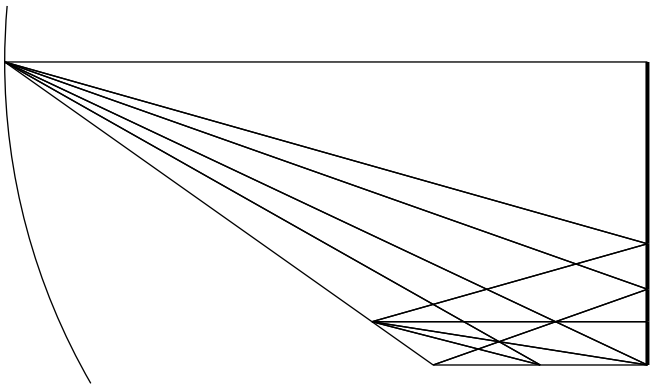

FIGURE 8. Fundamental domain for $-2k = -16$

$$h_3 \quad = \quad [[17, 8, -3], [0, 1, 0], [96, 48, -17]]$$

D_0	$(1,-2,0)$	(-2)-wall
	$(0,1,5)$	D_1
	$(0,0,-1)$	$\cong D_0$ by h_1

D_1	$(1,-1,5)$	D_2
	$(0,1,4)$	D_3
	$(0,-1,-5)$	D_0

D_2	$(1,-2,0)$	(-2)-wall
	$(-1,1,-5)$	D_1
	$(0,1,4)$	D_4

D_3	$(1,-1,5)$	D_4
	$(0,1,3)$	D_5
	$(0,-1,-4)$	D_1

D_4	$(1,-1,4)$	D_6
	$(0,1,3)$	D_7
	$(-1,1,-5)$	D_3
	$(0,-1,-4)$	D_2

D_5	$(1,-1,5)$	D_7
	$(0,2,5)$	D_8
	$(0,-1,-3)$	D_3

D_6	$(1,-2,0)$	(-2)-wall
	$(1,0,7)$	D_9
	$(-1,1,-4)$	D_4

D_7	$(0,-1,-3)$	D_4
	$(1,0,7)$	D_{11}
	$(0,2,5)$	D_{10}
	$(-1,1,-5)$	D_5

D_8	$(1,-1,5)$	D_{10}
	$(0,1,2)$	$\cong D_8$ by h_2
	$(0,-2,-5)$	D_5

D_9	$(1,-2,0)$	(-2)-wall
	$(-1,0,-7)$	D_6
	$(0,1,3)$	D_{12}

D_{10}	$(0,-2,-5)$	D_7
	$(1,0,7)$	D_{13}
	$(-1,1,-5)$	D_8

D_{11}	$(1,-1,4)$	D_{12}
	$(-1,0,-7)$	D_7
	$(0,2,5)$	D_{13}

D_{12}	$(-1,1,-4)$	D_{11}
	$(1,1,9)$	D_{14}
	$(0,-1,-3)$	D_9

D_{13}	$(0,-2,-5)$	D_{11}
	$(-1,0,-7)$	D_{10}
	$(1,1,9)$	D_{15}

D_{14}	$(1,0,6)$	$\cong D_{14}$ by h_3
	$(0,2,5)$	D_{16}
	$(-1,-1,-9)$	D_{12}

D_{15}	$(1,-1,4)$	D_{16}
	$(-1,-1,-9)$	D_{13}
	$(1,2,11)$	D_{17}

D_{16}	$(0,-2,-5)$	D_{14}
	$(1,2,11)$	D_{18}
	$(-1,1,-4)$	D_{15}

D_{17}	$(1,-1,4)$	D_{18}
	$(-1,-2,-11)$	D_{15}
	$(0,1,2)$	$\cong D_{17}$ by h_2

D_{18}	$(1,0,6)$	$\cong D_{18}$ by h_3
	$(-1,-2,-11)$	D_{16}
	$(-1,1,-4)$	D_{17}

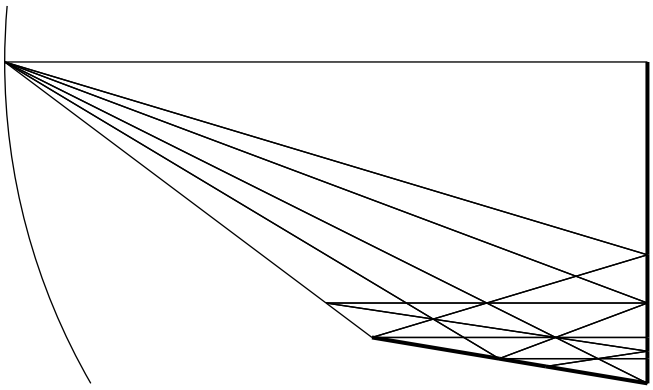

FIGURE 9. Fundamental domain for $-2k = -18$

no extra automorphisms

D_0	$(1,-2,0)$	(-2)-wall	D_1	$(1,-1,5)$	D_2	D_2	$(1,-2,0)$	(-2)-wall
	$(0,1,5)$	D_1		$(0,1,4)$	D_3		$(-1,1,-5)$	D_1
	$(0,0,-1)$	$\cong D_0$ by h_1		$(0,-1,-5)$	D_0		$(0,1,4)$	D_4
D_3	$(1,-1,5)$	D_4	D_4	$(0,-1,-4)$	D_2	D_5	$(0,-1,-3)$	D_3
	$(0,1,3)$	D_5		$(-1,1,-5)$	D_3		$(0,2,5)$	D_8
	$(0,-1,-4)$	D_1		$(1,0,8)$	D_6		$(1,0,8)$	D_7
D_6	$(1,-1,4)$	D_9	D_7	$(1,-1,5)$	D_{10}	D_8	$(0,-2,-5)$	D_5
	$(-1,0,-8)$	D_4		$(0,2,5)$	D_{11}		$(1,0,8)$	D_{11}
	$(0,1,3)$	D_{10}		$(-1,0,-8)$	D_5		$(0,1,2)$	$\cong D_8$ by h_2
D_9	$(1,-2,0)$	(-2)-wall	D_{10}	$(0,-1,-3)$	D_6	D_{11}	$(0,-2,-5)$	D_7
	$(1,0,7)$	D_{12}		$(-1,1,-5)$	D_7		$(-1,0,-8)$	D_8
	$(-1,1,-4)$	D_6		$(1,1,10)$	D_{13}		$(1,1,10)$	D_{14}
D_{12}	$(1,-2,0)$	(-2)-wall	D_{13}	$(-1,-1,-10)$	D_{10}	D_{14}	$(1,-1,5)$	D_{16}
	$(-1,0,-7)$	D_9		$(1,0,7)$	D_{17}		$(-1,-1,-10)$	D_{11}
	$(1,1,10)$	D_{15}		$(0,2,5)$	D_{16}		$(0,1,2)$	$\cong D_{14}$ by h_2
D_{15}	$(2,-1,10)$	D_{18}	D_{16}	$(0,-2,-5)$	D_{13}	D_{17}	$(1,-1,4)$	D_{19}
	$(-1,-1,-10)$	D_{12}		$(1,0,7)$	D_{20}		$(-1,0,-7)$	D_{13}
	$(0,1,3)$	D_{19}		$(-1,1,-5)$	D_{14}		$(0,2,5)$	D_{20}
D_{18}	$(1,-2,0)$	(-2)-wall	D_{19}	$(-1,1,-4)$	D_{17}	D_{20}	$(0,-2,-5)$	D_{17}
	$(-2,1,-10)$	D_{15}		$(2,0,13)$	D_{22}		$(-1,0,-7)$	D_{16}
	$(2,0,13)$	D_{21}		$(0,-1,-3)$	D_{15}		$(1,1,9)$	(-2)-wall
D_{21}	$(1,-2,0)$	(-2)-wall	D_{22}	$(2,-1,10)$	D_{23}	D_{23}	$(0,-1,-3)$	D_{21}
	$(-2,0,-13)$	D_{18}		$(1,1,9)$	(-2)-wall		$(1,1,9)$	(-2)-wall
	$(0,1,3)$	D_{23}		$(-2,0,-13)$	D_{19}		$(-2,1,-10)$	D_{22}

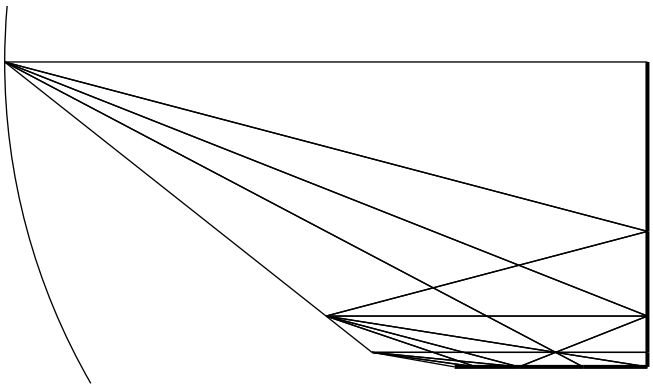

FIGURE 10. Fundamental domain for $-2k = -20$

$$h_3 \quad = \quad [[121, 40, -18], [120, 41, -18], [1080, 360, -161]]$$

D_0	$(0,1,4)$	D_3
	$(0,-1,-6)$	D_2
	$(1,-1,6)$	D_1

D_1	$(1,-2,0)$	(-2)-wall
	$(-1,1,-6)$	D_0
	$(0,1,4)$	D_4

D_2	$(1,-2,0)$	(-2)-wall
	$(0,1,6)$	D_0
	$(0,0,-1)$	$\cong D_2$ by h_1

D_3	$(0,-1,-4)$	D_0
	$(1,-1,6)$	D_4
	$(0,1,3)$	D_5

D_4	$(0,-1,-4)$	D_1
	$(-1,1,-6)$	D_3
	$(0,1,3)$	D_7
	$(1,0,8)$	D_6

D_5	$(0,-1,-3)$	D_3
	$(1,-1,6)$	D_7
	$(0,1,2)$	$\cong D_5$ by h_2

D_6	$(1,-1,4)$	D_8
	$(-1,0,-8)$	D_4
	$(0,1,3)$	D_9

D_7	$(0,-1,-3)$	D_4
	$(-1,1,-6)$	D_5
	$(1,0,8)$	D_9

D_8	$(1,-2,0)$	(-2)-wall
	$(1,0,7)$	D_{10}
	$(-1,1,-4)$	D_6

D_9	$(0,-1,-3)$	D_6
	$(-1,0,-8)$	D_7
	$(1,1,10)$	D_{11}

D_{10}	$(1,-2,0)$	(-2)-wall
	$(-1,0,-7)$	D_8
	$(1,1,10)$	D_{12}

D_{11}	$(-1,-1,-10)$	D_9
	$(1,2,12)$	D_{13}
	$(1,0,7)$	D_{14}

D_{12}	$(0,1,3)$	D_{15}
	$(3,0,20)$	(-2)-wall
	$(-1,-1,-10)$	D_{10}

D_{13}	$(1,0,7)$	D_{17}
	$(-1,-2,-12)$	D_{11}
	$(1,3,14)$	D_{16}

D_{14}	$(1,-1,4)$	D_{15}
	$(1,2,12)$	D_{17}
	$(-1,0,-7)$	D_{11}

D_{15}	$(-1,1,-4)$	D_{14}
	$(3,0,20)$	(-2)-wall
	$(0,-1,-3)$	D_{12}

D_{16}	$(0,1,2)$	$\cong D_{16}$ by h_2
	$(-1,-3,-14)$	D_{13}
	$(1,0,7)$	D_{18}

D_{17}	$(-1,0,-7)$	D_{13}
	$(-1,-2,-12)$	D_{14}
	$(2,1,16)$	D_{19}
	$(1,3,14)$	D_{18}

D_{18}	$(-1,0,-7)$	D_{16}
	$(-1,-3,-14)$	D_{17}
	$(2,1,16)$	D_{20}

D_{19}	$(-2,-1,-16)$	D_{17}
	$(3,0,20)$	(-2)-wall
	$(1,3,14)$	D_{20}

D_{20}	$(4,3,34)$	D_{21}
	$(-1,-3,-14)$	D_{19}
	$(-2,-1,-16)$	D_{18}

D_{21}	$(-4,-3,-34)$	D_{20}
	$(3,0,20)$	(-2)-wall
	$(1,1,9)$	$\cong D_{21}$ by h_3

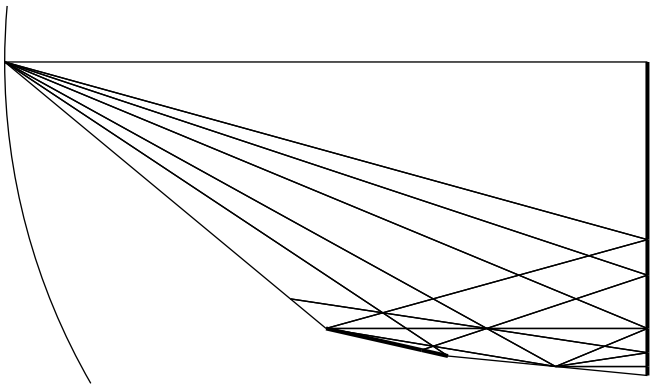

FIGURE 11. Fundamental domain for $-2k = -22$

$$h_3 \quad = \quad [[20, 9, -3], [7, 2, -1], [154, 66, -23]]$$

D_0	$(1,-2,0)$	(-2)-wall	D_1	$(0,1,5)$	D_3	D_2	$(1,-2,0)$	(-2)-wall
	$(0,1,6)$	D_1		$(0,-1,-6)$	D_0		$(-1,1,-6)$	D_1
	$(0,0,-1)$	$\cong D_0$ by h_1		$(1,-1,6)$	D_2		$(0,1,5)$	D_4
D_3	$(0,-1,-5)$	D_1	D_4	$(1,-1,5)$	D_6	D_5	$(0,-1,-4)$	D_3
	$(1,-1,6)$	D_4		$(0,1,4)$	D_7		$(1,-1,6)$	D_7
	$(0,1,4)$	D_5		$(-1,1,-6)$	D_3		$(0,1,3)$	D_8
				$(0,-1,-5)$	D_2			
D_6	$(1,-2,0)$	(-2)-wall	D_7	$(1,-1,5)$	D_9	D_8	$(0,-1,-3)$	D_5
	$(-1,1,-5)$	D_4		$(0,1,3)$	D_{10}		$(1,-1,6)$	D_{10}
	$(0,1,4)$	D_9		$(-1,1,-6)$	D_5		$(0,2,5)$	D_{11}
				$(0,-1,-4)$	D_4			
D_9	$(0,-1,-4)$	D_6	D_{10}	$(0,-1,-3)$	D_7	D_{11}	$(0,-2,-5)$	D_8
	$(-1,1,-5)$	D_7		$(1,1,11)$	D_{13}		$(1,1,11)$	D_{14}
	$(1,0,8)$	D_{12}		$(-1,1,-6)$	D_8		$(0,1,2)$	$\cong D_{11}$ by h_2
D_{12}	$(1,-1,4)$	D_{16}	D_{13}	$(1,0,8)$	D_{18}	D_{14}	$(0,1,2)$	$\cong D_{14}$ by h_2
	$(1,1,11)$	D_{15}		$(-1,-1,-11)$	D_{10}		$(-1,-1,-11)$	D_{11}
	$(-1,0,-8)$	D_9		$(0,2,5)$	D_{17}		$(1,-1,6)$	D_{17}
D_{15}	$(1,-1,4)$	D_{19}	D_{16}	$(1,-2,0)$	(-2)-wall	D_{17}	$(0,-2,-5)$	D_{13}
	$(-1,-1,-11)$	D_{12}		$(1,1,11)$	D_{19}		$(-1,1,-6)$	D_{14}
	$(0,1,3)$	D_{20}		$(-1,1,-4)$	D_{12}		$(1,0,8)$	D_{21}
D_{18}	$(1,-1,5)$	D_{20}	D_{19}	$(-1,1,-4)$	D_{15}	D_{20}	$(0,-1,-3)$	D_{15}
	$(0,2,5)$	D_{21}		$(-1,-1,-11)$	D_{16}		$(-1,1,-5)$	D_{18}
	$(-1,0,-8)$	D_{13}		$(2,-1,11)$	D_{22}		$(1,1,10)$	D_{23}
D_{21}	$(0,-2,-5)$	D_{18}	D_{22}	$(1,-2,0)$	(-2)-wall	D_{23}	$(-1,-1,-10)$	D_{20}
	$(-1,0,-8)$	D_{17}		$(-2,1,-11)$	D_{19}		$(2,1,17)$	$\cong D_{25}$ by h_3
	$(1,1,10)$	D_{24}		$(1,0,7)$	D_{25}		$(0,2,5)$	D_{26}
D_{24}	$(1,-1,5)$	D_{26}	D_{25}	$(1,-2,0)$	(-2)-wall	D_{26}	$(0,-2,-5)$	D_{23}
	$(2,3,22)$	(-2)-wall		$(2,1,17)$	$\cong D_{23}$ by h_3		$(2,3,22)$	(-2)-wall
	$(-1,-1,-10)$	D_{21}		$(-1,0,-7)$	D_{22}		$(-1,1,-5)$	D_{24}

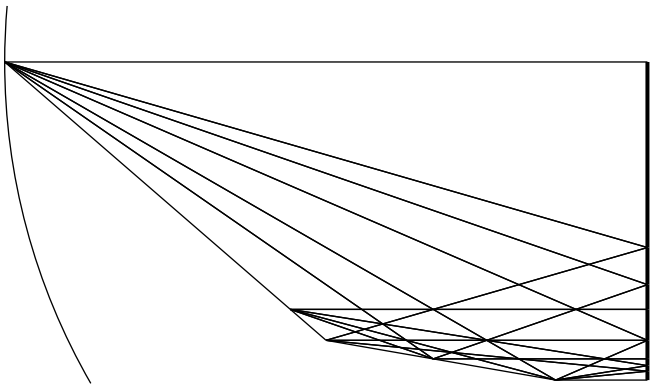

FIGURE 12. Fundamental domain for $-2k = -24$

$$h_3 = [[37, 12, -5], [36, 13, -5], [360, 120, -49]]$$
$$h_4 = [[97, 48, -14], [0, 1, 0], [672, 336, -97]]$$

D_0	$(1,-2,0)$	(-2)-wall	D_1	$(0,1,5)$	D_3	D_2	$(1,-2,0)$	(-2)-wall
	$(0,1,6)$	D_1		$(0,-1,-6)$	D_0		$(-1,1,-6)$	D_1
	$(0,0,-1)$	$\cong D_0$ by h_1		$(1,-1,6)$	D_2		$(0,1,5)$	D_4
D_3	$(0,-1,-5)$	D_1	D_4	$(1,-1,5)$	D_6	D_5	$(0,-1,-4)$	D_3
	$(1,-1,6)$	D_4		$(0,1,4)$	D_7		$(1,-1,6)$	D_7
	$(0,1,4)$	D_5		$(-1,1,-6)$	D_3		$(0,1,3)$	D_8
				$(0,-1,-5)$	D_2			
D_6	$(1,-2,0)$	(-2)-wall	D_7	$(0,-1,-4)$	D_4	D_8	$(0,-1,-3)$	D_5
	$(1,0,9)$	D_9		$(1,0,9)$	D_{10}		$(1,0,9)$	D_{11}
	$(-1,1,-5)$	D_4		$(-1,1,-6)$	D_5		$(0,2,5)$	D_{12}
D_9	$(1,-2,0)$	(-2)-wall	D_{10}	$(1,-1,5)$	D_{13}	D_{11}	$(0,2,5)$	D_{15}
	$(-1,0,-9)$	D_6		$(-1,0,-9)$	D_7		$(-1,0,-9)$	D_8
	$(0,1,4)$	D_{13}		$(0,1,3)$	D_{14}		$(1,-1,6)$	D_{14}
D_{12}	$(0,-2,-5)$	D_8	D_{13}	$(0,-1,-4)$	D_9	D_{14}	$(0,-1,-3)$	D_{10}
	$(1,0,9)$	D_{15}		$(-1,1,-5)$	D_{10}		$(1,1,11)$	D_{17}
	$(0,1,2)$	$\cong D_{12}$ by h_2		$(1,0,8)$	D_{16}		$(-1,1,-6)$	D_{11}
D_{15}	$(0,-2,-5)$	D_{11}	D_{16}	$(1,-1,4)$	D_{20}	D_{17}	$(1,0,8)$	D_{22}
	$(-1,0,-9)$	D_{12}		$(1,1,11)$	D_{19}		$(-1,-1,-11)$	D_{14}
	$(1,1,11)$	D_{18}		$(-1,0,-8)$	D_{13}		$(0,2,5)$	D_{21}
D_{18}	$(1,-1,6)$	D_{21}	D_{19}	$(0,1,3)$	D_{25}	D_{20}	$(1,-2,0)$	(-2)-wall
	$(1,2,13)$	D_{23}		$(2,0,15)$	D_{24}		$(2,0,15)$	D_{26}
	$(-1,-1,-11)$	D_{15}		$(-1,-1,-11)$	D_{16}		$(-1,1,-4)$	D_{16}
D_{21}	$(0,-2,-5)$	D_{17}	D_{22}	$(1,-1,5)$	D_{25}	D_{23}	$(1,-1,6)$	D_{27}
	$(1,2,13)$	D_{27}		$(1,2,13)$	D_{28}		$(-1,-2,-13)$	D_{18}
	$(-1,1,-6)$	D_{18}		$(-1,0,-8)$	D_{17}		$(1,3,15)$	D_{29}
D_{24}	$(1,-1,4)$	D_{31}	D_{25}	$(0,-1,-3)$	D_{19}	D_{26}	$(1,-2,0)$	(-2)-wall
	$(-2,0,-15)$	D_{19}		$(2,1,18)$	D_{32}		$(-2,0,-15)$	D_{20}
	$(2,1,18)$	D_{30}		$(-1,1,-5)$	D_{22}		$(1,1,11)$	D_{31}
D_{27}	$(1,0,8)$	D_{34}	D_{28}	$(0,2,5)$	D_{34}	D_{29}	$(0,1,2)$	$\cong D_{29}$ by h_2
	$(-1,-2,-13)$	D_{21}		$(-1,-2,-13)$	D_{22}		$(-1,-3,-15)$	D_{23}
	$(-1,1,-6)$	D_{23}		$(2,1,18)$	D_{35}		$(1,-1,6)$	D_{33}
	$(1,3,15)$	D_{33}						
D_{30}	$(1,-1,4)$	D_{36}	D_{31}	$(-1,1,-4)$	D_{24}	D_{32}	$(-2,-1,-18)$	D_{25}
	$(-2,-1,-18)$	D_{24}		$(2,1,18)$	D_{36}		$(1,2,13)$	D_{39}
	$(0,1,3)$	D_{37}		$(2,-1,11)$	D_{38}		$(2,0,15)$	D_{37}
				$(-1,-1,-11)$	D_{26}			
D_{33}	$(1,0,8)$	D_{40}	D_{34}	$(0,-2,-5)$	D_{28}	D_{35}	$(1,-1,5)$	D_{39}
	$(-1,-3,-15)$	D_{27}		$(2,1,18)$	D_{41}		$(-2,-1,-18)$	D_{28}
	$(-1,1,-6)$	D_{29}		$(1,3,15)$	D_{40}		$(0,2,5)$	D_{41}
				$(-1,0,-8)$	D_{27}			
D_{36}	$(-1,1,-4)$	D_{30}	D_{37}	$(0,-1,-3)$	D_{30}	D_{38}	$(1,-2,0)$	(-2)-wall
	$(-2,-1,-18)$	D_{31}		$(1,2,13)$	D_{43}		$(2,1,18)$	D_{42}
	$(2,-1,11)$	D_{42}		$(-2,0,-15)$	D_{32}		$(-2,1,-11)$	D_{31}

D_{39}	$(-1,1,-5)$	D_{35}	D_{40}	$(-1,0,-8)$	D_{33}	D_{41}	$(0,-2,-5)$	D_{35}
	$(2,0,15)$	D_{43}		$(2,1,18)$	D_{44}		$(1,3,15)$	D_{44}
	$(-1,-2,-13)$	D_{32}		$(-1,-3,-15)$	D_{34}		$(-2,-1,-18)$	D_{34}
D_{42}	$(-2,1,-11)$	D_{36}	D_{43}	$(1,1,10)$	$\cong D_{43}$ by h_3	D_{44}	$(1,1,10)$	$\cong D_{44}$ by h_3
	$(-2,-1,-18)$	D_{38}		$(-1,-2,-13)$	D_{37}		$(-1,-3,-15)$	D_{41}
	$(3,-1,18)$	D_{45}		$(-2,0,-15)$	D_{39}		$(-2,-1,-18)$	D_{40}
D_{45}	$(1,-2,0)$	(-2)-wall						
	$(-3,1,-18)$	D_{42}						
	$(1,0,7)$	$\cong D_{45}$ by h_4						

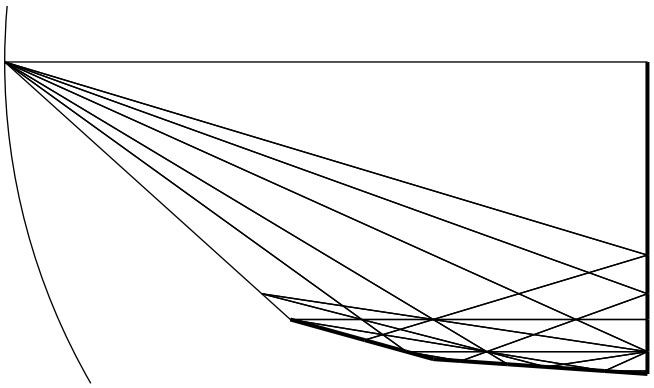

FIGURE 13. Fundamental domain for $-2k = -26$

no extra automorphisms

D_0	$(1,-2,0)$	(-2)-wall	D_1	$(0,1,5)$	D_3	D_2	$(1,-2,0)$	(-2)-wall
	$(0,1,6)$	D_1		$(0,-1,-6)$	D_0		$(-1,1,-6)$	D_1
	$(0,0,-1)$	$\cong D_0$ by h_1		$(1,-1,6)$	D_2		$(0,1,5)$	D_4
D_3	$(0,-1,-5)$	D_1	D_4	$(1,-1,5)$	D_6	D_5	$(0,-1,-4)$	D_3
	$(1,-1,6)$	D_4		$(0,1,4)$	D_7		$(1,-1,6)$	D_7
	$(0,1,4)$	D_5		$(-1,1,-6)$	D_3		$(0,1,3)$	D_8
				$(0,-1,-5)$	D_2			
D_6	$(1,-2,0)$	(-2)-wall	D_7	$(0,-1,-4)$	D_4	D_8	$(0,-1,-3)$	D_5
	$(1,0,9)$	D_9		$(1,0,9)$	D_{10}		$(1,1,12)$	D_{11}
	$(-1,1,-5)$	D_4		$(-1,1,-6)$	D_5		$(0,2,5)$	D_{12}
D_9	$(1,-2,0)$	(-2)-wall	D_{10}	$(1,-1,5)$	D_{13}	D_{11}	$(0,2,5)$	D_{16}
	$(-1,0,-9)$	D_6		$(1,1,12)$	D_{14}		$(-1,-1,-12)$	D_8
	$(0,1,4)$	D_{13}		$(-1,0,-9)$	D_7		$(1,0,9)$	D_{15}
D_{12}	$(0,-2,-5)$	D_8	D_{13}	$(0,-1,-4)$	D_9	D_{14}	$(1,-1,5)$	D_{17}
	$(1,1,12)$	D_{16}		$(1,1,12)$	D_{17}		$(-1,-1,-12)$	D_{10}
	$(0,1,2)$	$\cong D_{12}$ by h_2		$(-1,1,-5)$	D_{10}		$(0,1,3)$	D_{18}
D_{15}	$(1,-1,6)$	D_{18}	D_{16}	$(0,-2,-5)$	D_{11}	D_{17}	$(1,0,8)$	D_{21}
	$(1,2,14)$	D_{19}		$(-1,-1,-12)$	D_{12}		$(-1,-1,-12)$	D_{13}
	$(-1,0,-9)$	D_{11}		$(1,2,14)$	D_{20}		$(-1,1,-5)$	D_{14}
D_{18}	$(0,-1,-3)$	D_{14}	D_{19}	$(0,2,5)$	D_{23}	D_{20}	$(0,1,2)$	$\cong D_{20}$ by h_2
	$(1,2,14)$	D_{22}		$(-1,-2,-14)$	D_{15}		$(-1,-2,-14)$	D_{16}
	$(-1,1,-6)$	D_{15}		$(1,-1,6)$	D_{22}		$(1,0,9)$	D_{23}
D_{21}	$(-1,0,-8)$	D_{17}	D_{22}	$(-1,1,-6)$	D_{19}	D_{23}	$(0,-2,-5)$	D_{19}
	$(2,-1,12)$	D_{24}		$(-1,-2,-14)$	D_{18}		$(-1,0,-9)$	D_{20}
	$(1,1,11)$	D_{25}		$(1,1,11)$	D_{26}		$(1,1,11)$	D_{27}
D_{24}	$(1,-1,4)$	D_{29}	D_{25}	$(-1,-1,-11)$	D_{21}	D_{26}	$(1,0,8)$	D_{32}
	$(-2,1,-12)$	D_{21}		$(1,2,14)$	D_{30}		$(-1,-1,-11)$	D_{22}
	$(1,1,11)$	D_{28}		$(2,-1,12)$	D_{28}		$(0,2,5)$	D_{31}
D_{27}	$(1,-1,6)$	D_{31}	D_{28}	$(-1,-1,-11)$	D_{24}	D_{29}	$(1,-2,0)$	(-2)-wall
	$(1,2,13)$	(-2)-wall		$(-2,1,-12)$	D_{25}		$(2,0,15)$	D_{33}
	$(-1,-1,-11)$	D_{23}		$(3,1,26)$	(-2)-wall		$(-1,1,-4)$	D_{24}
D_{30}	$(0,1,3)$	D_{34}	D_{31}	$(0,-2,-5)$	D_{26}	D_{32}	$(1,-1,5)$	D_{34}
	$(-1,-2,-14)$	D_{25}		$(1,2,13)$	(-2)-wall		$(2,2,21)$	D_{35}
	$(3,1,26)$	(-2)-wall		$(-1,1,-6)$	D_{27}		$(-1,0,-8)$	D_{26}
D_{33}	$(1,-2,0)$	(-2)-wall	D_{34}	$(0,-1,-3)$	D_{30}	D_{35}	$(1,2,13)$	(-2)-wall
	$(3,1,26)$	(-2)-wall		$(3,1,26)$	(-2)-wall		$(3,1,26)$	(-2)-wall
	$(-2,0,-15)$	D_{29}		$(-1,1,-5)$	D_{32}		$(-2,-2,-21)$	D_{32}

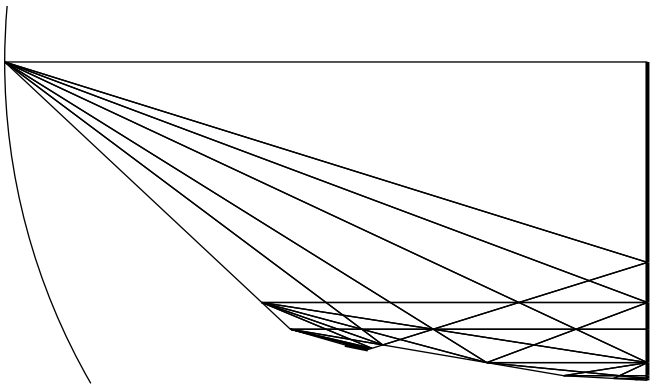

FIGURE 14. Fundamental domain for $-2k = -28$

$$h_3 = [[23, 9, -3], [16, 5, -2], [224, 84, -29]]$$

$$h_4 = [[225, 56, -26], [448, 113, -52], [2912, 728, -337]]$$

D_0	$(1,-2,0)$	(-2)-wall	D_1	$(0,1,5)$	D_3	D_2	$(1,-2,0)$	(-2)-wall
	$(0,1,6)$	D_1		$(0,-1,-6)$	D_0		$(-1,1,-6)$	D_1
	$(0,0,-1)$	$\cong D_0$ by h_1		$(1,-1,6)$	D_2		$(0,1,5)$	D_4
D_3	$(0,-1,-5)$	D_1	D_4	$(0,-1,-5)$	D_2	D_5	$(0,-1,-4)$	D_3
	$(1,-1,6)$	D_4		$(1,0,10)$	D_6		$(1,0,10)$	D_7
	$(0,1,4)$	D_5		$(-1,1,-6)$	D_3		$(0,1,3)$	D_8
D_6	$(1,-1,5)$	D_9	D_7	$(0,1,3)$	D_{11}	D_8	$(0,-1,-3)$	D_5
	$(-1,0,-10)$	D_4		$(-1,0,-10)$	D_5		$(1,0,10)$	D_{11}
	$(0,1,4)$	D_{10}		$(1,-1,6)$	D_{10}		$(0,2,5)$	D_{12}
D_9	$(1,-2,0)$	(-2)-wall	D_{10}	$(0,-1,-4)$	D_6	D_{11}	$(0,-1,-3)$	D_7
	$(1,0,9)$	D_{13}		$(1,0,9)$	D_{14}		$(-1,0,-10)$	D_8
	$(-1,1,-5)$	D_6		$(-1,1,-6)$	D_7		$(0,2,5)$	D_{16}
							$(1,1,12)$	D_{15}
D_{12}	$(0,-2,-5)$	D_8	D_{13}	$(1,-2,0)$	(-2)-wall	D_{14}	$(1,-1,5)$	D_{17}
	$(1,0,10)$	D_{16}		$(-1,0,-9)$	D_9		$(1,1,12)$	D_{18}
	$(0,1,2)$	$\cong D_{12}$ by h_2		$(0,1,4)$	D_{17}		$(-1,0,-9)$	D_{10}
D_{15}	$(0,2,5)$	D_{19}	D_{16}	$(0,-2,-5)$	D_{11}	D_{17}	$(0,-1,-4)$	D_{13}
	$(-1,-1,-12)$	D_{11}		$(-1,0,-10)$	D_{12}		$(1,1,12)$	D_{21}
	$(1,0,9)$	D_{20}		$(1,1,12)$	D_{19}		$(-1,1,-5)$	D_{14}
D_{18}	$(1,-1,5)$	D_{21}	D_{19}	$(0,-2,-5)$	D_{15}	D_{20}	$(1,-1,6)$	D_{22}
	$(-1,-1,-12)$	D_{14}		$(-1,-1,-12)$	D_{16}		$(1,2,14)$	D_{24}
	$(0,1,3)$	D_{22}		$(1,2,14)$	D_{23}		$(-1,0,-9)$	D_{15}
D_{21}	$(1,0,8)$	D_{25}	D_{22}	$(0,-1,-3)$	D_{18}	D_{23}	$(1,0,9)$	D_{28}
	$(-1,-1,-12)$	D_{17}		$(1,2,14)$	D_{26}		$(1,3,16)$	D_{27}
	$(-1,1,-5)$	D_{18}		$(-1,1,-6)$	D_{20}		$(-1,-2,-14)$	D_{19}
D_{24}	$(0,2,5)$	D_{28}	D_{25}	$(-1,0,-8)$	D_{21}	D_{26}	$(-1,1,-6)$	D_{24}
	$(-1,-2,-14)$	D_{20}		$(2,1,19)$	D_{30}		$(-1,-2,-14)$	D_{22}
	$(1,-1,6)$	D_{26}		$(2,-1,12)$	D_{29}		$(1,1,11)$	$\cong D_{30}$ by h_3
D_{27}	$(1,0,9)$	D_{32}	D_{28}	$(0,-2,-5)$	D_{24}	D_{29}	$(1,-1,4)$	D_{34}
	$(-1,-3,-16)$	D_{23}		$(1,3,16)$	D_{32}		$(2,1,19)$	D_{33}
	$(1,4,18)$	D_{31}		$(-1,0,-9)$	D_{23}		$(-2,1,-12)$	D_{25}
D_{30}	$(1,1,11)$	$\cong D_{26}$ by h_3	D_{31}	$(0,1,2)$	$\cong D_{31}$ by h_2	D_{32}	$(1,1,11)$	D_{36}
	$(-2,-1,-19)$	D_{25}		$(-1,-4,-18)$	D_{27}		$(-1,-3,-16)$	D_{28}
	$(2,-1,12)$	D_{33}		$(1,0,9)$	D_{35}		$(-1,0,-9)$	D_{27}
							$(1,4,18)$	D_{35}
D_{33}	$(-2,1,-12)$	D_{30}	D_{34}	$(1,-2,0)$	(-2)-wall	D_{35}	$(1,1,11)$	D_{39}
	$(-2,-1,-19)$	D_{29}		$(3,0,23)$	D_{38}		$(-1,-4,-18)$	D_{32}
	$(3,0,23)$	D_{37}		$(-1,1,-4)$	D_{29}		$(-1,0,-9)$	D_{31}
D_{36}	$(1,-1,6)$	$\cong D_{37}$ by h_3	D_{37}	$(1,-1,4)$	D_{40}	D_{38}	$(1,-2,0)$	(-2)-wall
	$(1,4,18)$	D_{39}		$(-3,0,-23)$	D_{33}		$(2,1,19)$	D_{40}
	$(-1,-1,-11)$	D_{32}		$(4,1,34)$	$\cong D_{36}$ by h_3		$(-3,0,-23)$	D_{34}
D_{39}	$(-1,-1,-11)$	D_{35}	D_{40}	$(-1,1,-4)$	D_{37}	D_{41}	$(1,-1,6)$	$\cong D_{42}$ by h_3
	$(-1,-4,-18)$	D_{36}		$(-2,-1,-19)$	D_{38}		$(-2,-3,-24)$	D_{39}
	$(2,3,24)$	D_{41}		$(5,0,38)$	D_{42}		$(3,5,37)$	D_{43}
D_{42}	$(3,-1,19)$	D_{44}	D_{43}	$(1,-1,6)$	$\cong D_{44}$ by h_3	D_{44}	$(1,-2,0)$	(-2)-wall
	$(4,1,34)$	$\cong D_{41}$ by h_3		$(-3,-5,-37)$	D_{41}		$(4,1,34)$	$\cong D_{43}$ by h_3
	$(-5,0,-38)$	D_{40}		$(4,7,50)$	D_{45}		$(-3,1,-19)$	D_{42}
D_{45}	$(1,2,13)$	$\cong D_{45}$ by h_4						
	$(-4,-7,-50)$	D_{43}						
	$(5,6,56)$	(-2)-wall						

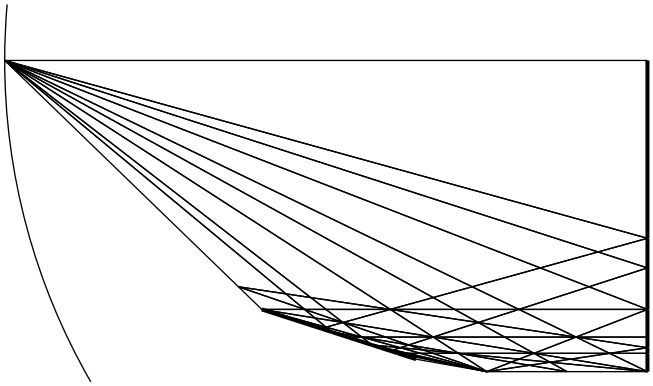

FIGURE 15. Fundamental domain for $-2k = -30$

$$h_3 = [[31, 15, -4], [0, 1, 0], [240, 120, -31]]$$

$$h_4 = [[181, 60, -22], [180, 61, -22], [1980, 660, -241]]$$

D_0	$(1,-2,0)$	(-2)-wall	D_1	$(0,1,6)$	D_3	D_2	$(1,-2,0)$	(-2)-wall
	$(0,1,7)$	D_1		$(0,-1,-7)$	D_0		$(-1,1,-7)$	D_1
	$(0,0,-1)$	$\cong D_0$ by h_1		$(1,-1,7)$	D_2		$(0,1,6)$	D_4
D_3	$(0,1,5)$	D_5	D_4	$(0,1,5)$	D_7	D_5	$(0,-1,-5)$	D_3
	$(1,-1,7)$	D_4		$(-1,1,-7)$	D_3		$(1,-1,7)$	D_7
	$(0,-1,-6)$	D_1		$(0,-1,-6)$	D_2		$(0,1,4)$	D_8
				$(1,-1,6)$	D_6			
D_6	$(1,-2,0)$	(-2)-wall	D_7	$(0,-1,-5)$	D_4	D_8	$(0,-1,-4)$	D_5
	$(-1,1,-6)$	D_4		$(-1,1,-7)$	D_5		$(1,-1,7)$	D_{10}
	$(0,1,5)$	D_9		$(0,1,4)$	D_{10}		$(0,2,7)$	D_{11}
				$(1,-1,6)$	D_9			
D_9	$(0,-1,-5)$	D_6	D_{10}	$(0,-1,-4)$	D_7	D_{11}	$(0,1,3)$	D_{15}
	$(1,0,10)$	D_{12}		$(-1,1,-7)$	D_8		$(1,-1,7)$	D_{13}
	$(-1,1,-6)$	D_7		$(0,2,7)$	D_{13}		$(0,-2,-7)$	D_8
				$(1,0,10)$	D_{14}			
D_{12}	$(1,-1,5)$	D_{16}	D_{13}	$(1,0,10)$	D_{18}	D_{14}	$(1,-1,6)$	D_{17}
	$(-1,0,-10)$	D_9		$(-1,1,-7)$	D_{11}		$(0,2,7)$	D_{18}
	$(0,1,4)$	D_{17}		$(0,-2,-7)$	D_{10}		$(-1,0,-10)$	D_{10}
D_{15}	$(0,-1,-3)$	D_{11}	D_{16}	$(1,-2,0)$	(-2)-wall	D_{17}	$(0,-1,-4)$	D_{12}
	$(1,1,13)$	D_{19}		$(1,0,9)$	D_{21}		$(1,1,13)$	D_{22}
	$(0,2,5)$	D_{20}		$(-1,1,-5)$	D_{12}		$(-1,1,-6)$	D_{14}
D_{18}	$(-1,0,-10)$	D_{13}	D_{19}	$(0,2,5)$	D_{25}	D_{20}	$(0,-2,-5)$	D_{15}
	$(0,-2,-7)$	D_{14}		$(-1,-1,-13)$	D_{15}		$(0,3,7)$	D_{26}
	$(1,1,13)$	D_{23}		$(1,0,10)$	D_{24}		$(1,1,13)$	D_{25}
D_{21}	$(1,-2,0)$	(-2)-wall	D_{22}	$(1,0,9)$	D_{29}	D_{23}	$(0,1,3)$	D_{30}
	$(1,1,13)$	D_{27}		$(0,2,7)$	D_{28}		$(-1,-1,-13)$	D_{18}
	$(-1,0,-9)$	D_{16}		$(-1,-1,-13)$	D_{17}		$(1,-1,6)$	D_{28}
D_{24}	$(0,2,5)$	D_{31}	D_{25}	$(0,-2,-5)$	D_{19}	D_{26}	$(0,1,2)$	$\cong D_{26}$ by h_2
	$(1,-1,7)$	D_{30}		$(-1,-1,-13)$	D_{20}		$(1,1,13)$	D_{32}
	$(-1,0,-10)$	D_{19}		$(0,3,7)$	D_{32}		$(0,-3,-7)$	D_{20}
				$(1,0,10)$	D_{31}			
D_{27}	$(0,1,4)$	D_{34}	D_{28}	$(-1,1,-6)$	D_{23}	D_{29}	$(1,-1,5)$	D_{34}
	$(-1,-1,-13)$	D_{21}		$(0,-2,-7)$	D_{22}		$(0,2,7)$	D_{35}
	$(2,-1,13)$	D_{33}		$(1,0,9)$	D_{35}		$(-1,0,-9)$	D_{22}
D_{30}	$(0,-1,-3)$	D_{23}	D_{31}	$(0,-2,-5)$	D_{24}	D_{32}	$(0,-3,-7)$	D_{25}
	$(-1,1,-7)$	D_{24}		$(1,3,17)$	D_{37}		$(1,3,17)$	D_{38}
	$(1,1,12)$	D_{36}		$(-1,0,-10)$	D_{25}		$(-1,-1,-13)$	D_{26}
D_{33}	$(1,-2,0)$	(-2)-wall	D_{34}	$(0,-1,-4)$	D_{27}	D_{35}	$(-1,0,-9)$	D_{28}
	$(-2,1,-13)$	D_{27}		$(2,0,17)$	D_{40}		$(0,-2,-7)$	D_{29}
	$(2,0,17)$	D_{39}		$(-1,1,-5)$	D_{29}		$(1,1,12)$	D_{41}

D_{36}	$(1,0,9)$	D_{43}	D_{37}	$(1,1,12)$	D_{45}	D_{38}	$(0,1,2)$	$\cong D_{38}$ by h_2
	$(1,3,17)$	D_{42}		$(0,3,7)$	D_{44}		$(-1,-3,-17)$	D_{32}
	$(-1,-1,-12)$	D_{30}		$(-1,-3,-17)$	D_{31}		$(1,0,10)$	D_{44}
D_{39}	$(1,-2,0)$	(-2)-wall	D_{40}	$(-2,0,-17)$	D_{34}	D_{41}	$(0,1,3)$	D_{49}
	$(0,1,4)$	D_{46}		$(2,-1,13)$	D_{46}		$(2,0,17)$	D_{48}
	$(-2,0,-17)$	D_{33}		$(1,1,12)$	D_{47}		$(-1,-1,-12)$	D_{35}
D_{42}	$(0,2,5)$	D_{50}	D_{43}	$(1,-1,6)$	D_{49}	D_{44}	$(1,1,12)$	D_{52}
	$(-1,-3,-17)$	D_{36}		$(1,3,17)$	D_{51}		$(0,-3,-7)$	D_{37}
	$(1,0,9)$	D_{51}		$(-1,0,-9)$	D_{36}		$(-1,0,-10)$	D_{38}
D_{45}	$(-1,-1,-12)$	D_{37}	D_{46}	$(0,-1,-4)$	D_{39}	D_{47}	$(-1,-1,-12)$	D_{40}
	$(0,3,7)$	D_{52}		$(-2,1,-13)$	D_{40}		$(0,2,7)$	D_{54}
	$(1,-1,7)$	D_{50}		$(1,1,12)$	D_{53}		$(2,-1,13)$	D_{53}
D_{48}	$(1,-1,5)$	D_{54}	D_{49}	$(2,2,23)$	D_{56}	D_{50}	$(0,-2,-5)$	D_{42}
	$(2,1,20)$	D_{55}		$(-1,1,-6)$	D_{43}		$(-1,1,-7)$	D_{45}
	$(-2,0,-17)$	D_{41}		$(0,-1,-3)$	D_{41}		$(1,2,14)$	D_{57}
D_{51}	$(2,2,23)$	D_{58}	D_{52}	$(1,2,14)$	D_{59}	D_{53}	$(2,1,20)$	D_{60}
	$(-1,-3,-17)$	D_{43}		$(0,-3,-7)$	D_{45}		$(-2,1,-13)$	D_{47}
	$(-1,0,-9)$	D_{42}		$(-1,-1,-12)$	D_{44}		$(-1,-1,-12)$	D_{46}
D_{54}	$(2,1,20)$	D_{61}	D_{55}	$(1,-1,5)$	D_{61}	D_{56}	$(2,1,20)$	D_{64}
	$(0,-2,-7)$	D_{47}		$(-2,-1,-20)$	D_{48}		$(1,3,17)$	D_{63}
	$(-1,1,-5)$	D_{48}		$(2,2,23)$	D_{62}		$(-2,-2,-23)$	D_{49}
D_{57}	$(2,2,23)$	D_{66}	D_{58}	$(-2,-2,-23)$	D_{51}	D_{59}	$(2,5,30)$	(-2)-wall
	$(0,3,7)$	D_{65}		$(1,2,14)$	D_{67}		$(1,-1,7)$	D_{65}
	$(-1,-2,-14)$	D_{50}		$(1,-1,6)$	D_{63}		$(-1,-2,-14)$	D_{52}
			D_{61}	$(2,2,23)$	D_{69}			
D_{60}	$(-2,-1,-20)$	D_{53}		$(2,-1,13)$	D_{68}	D_{62}	$(1,-1,5)$	D_{69}
	$(0,2,7)$	D_{68}		$(-2,-1,-20)$	D_{54}		$(0,1,3)$	D_{70}
	$(1,0,8)$	$\cong D_{60}$ by h_3		$(-1,1,-5)$	D_{55}		$(-2,-2,-23)$	D_{55}
D_{63}	$(2,1,20)$	D_{71}	D_{64}	$(-2,-1,-20)$	D_{56}	D_{65}	$(2,5,30)$	(-2)-wall
	$(-1,-3,-17)$	D_{56}		$(1,3,17)$	D_{71}		$(-1,1,-7)$	D_{59}
	$(-1,1,-6)$	D_{58}		$(2,0,17)$	D_{70}		$(0,-3,-7)$	D_{57}
D_{66}	$(-2,-2,-23)$	D_{57}	D_{67}	$(2,1,20)$	D_{73}	D_{68}	$(2,2,23)$	D_{74}
	$(1,0,9)$	D_{72}		$(-1,-2,-14)$	D_{58}		$(-2,1,-13)$	D_{61}
	$(2,5,30)$	(-2)-wall		$(0,2,5)$	D_{72}		$(0,-2,-7)$	D_{60}
						D_{71}	$(-2,-1,-20)$	D_{63}
D_{69}	$(-2,-2,-23)$	D_{61}	D_{70}	$(-2,0,-17)$	D_{64}		$(-1,-3,-17)$	D_{64}
	$(2,-1,13)$	D_{74}		$(1,3,17)$	D_{75}		$(2,0,17)$	D_{75}
	$(-1,1,-5)$	D_{62}		$(0,-1,-3)$	D_{62}		$(1,2,14)$	D_{76}

D_{72}	$(2,5,30)$	(-2)-wall	D_{73}	$(2,3,25)$	D_{77}	D_{74}	$(-2,-2,-23)$	D_{68}
	$(-1,0,-9)$	D_{66}		$(1,-1,6)$	D_{76}		$(-2,1,-13)$	D_{69}
	$(0,-2,-5)$	D_{67}		$(-2,-1,-20)$	D_{67}		$(1,0,8)$	$\cong D_{74}$ by h_3
D_{75}	$(-2,0,-17)$	D_{71}	D_{76}	$(2,3,25)$	D_{79}	D_{77}	$(2,5,30)$	(-2)-wall
	$(-1,-3,-17)$	D_{70}		$(2,0,17)$	D_{78}		$(1,-1,6)$	D_{79}
	$(1,2,14)$	D_{78}		$(-1,-2,-14)$	D_{71}		$(-2,-3,-25)$	D_{73}
				$(-1,1,-6)$	D_{73}			
D_{78}	$(2,3,25)$	D_{80}	D_{79}	$(3,4,36)$	D_{81}	D_{80}	$(-2,0,-17)$	D_{79}
	$(-1,-2,-14)$	D_{75}		$(2,0,17)$	D_{80}		$(-2,-3,-25)$	D_{78}
	$(-2,0,-17)$	D_{76}		$(-2,-3,-25)$	D_{76}		$(3,4,36)$	D_{82}
				$(-1,1,-6)$	D_{77}			
D_{81}	$(-3,-4,-36)$	D_{79}	D_{82}	$(-3,-4,-36)$	D_{80}	D_{83}	$(-4,-5,-47)$	D_{82}
	$(2,0,17)$	D_{82}		$(-2,0,-17)$	D_{81}		$(1,1,11)$	$\cong D_{83}$ by h_4
	$(2,5,30)$	(-2)-wall		$(4,5,47)$	D_{83}		$(2,5,30)$	(-2)-wall

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