$$\delta = \begin{pmatrix} 3 & 0 & 0 & 0 \\ 0 & 5 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{pmatrix} \qquad u = \begin{pmatrix} 0 & 1 & 0 & 0 \\ 6 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{pmatrix}$$

$$t = \begin{pmatrix} 1 & 1 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{pmatrix} \qquad v = \begin{pmatrix} 0 & 0 & 0 & 1 \\ 6 & 0 & 0 & 0 \\ 0 & 6 & 0 & 0 \\ 0 & 0 & 6 & 0 \end{pmatrix}$$

$$\delta = \begin{pmatrix} 0 & 3 & 5 & 5 & 0 & 4 \\ 6 & 0 & 0 & 4 & 0 & 3 \\ 2 & 5 & 1 & 0 & 6 & 0 \\ 3 & 0 & 1 & 3 & 4 & 4 \\ 0 & 2 & 0 & 5 & 4 & 2 \\ 6 & 2 & 2 & 3 & 0 & 3 \end{pmatrix} \qquad u = \begin{pmatrix} 5 & 1 & 1 & 2 & 2 & 4 \\ 6 & 5 & 4 & 6 & 4 & 4 \\ 2 & 5 & 2 & 4 & 4 & 2 \\ 2 & 3 & 1 & 4 & 6 & 3 \\ 5 & 2 & 3 & 0 & 2 & 4 \\ 1 & 0 & 0 & 3 & 6 & 5 \end{pmatrix}$$

$$t = \begin{pmatrix} 0 & 6 & 5 & 0 & 2 & 2 \\ 6 & 0 & 2 & 4 & 0 & 1 \\ 0 & 0 & 5 & 4 & 5 & 6 \\ 5 & 5 & 0 & 5 & 2 & 3 \\ 0 & 0 & 5 & 5 & 2 & 4 \\ 6 & 6 & 6 & 1 & 5 & 1 \end{pmatrix} \qquad v = \begin{pmatrix} 0 & 5 & 5 & 4 & 5 & 5 \\ 6 & 6 & 5 & 6 & 6 & 2 \\ 5 & 1 & 1 & 4 & 2 & 6 \\ 5 & 1 & 4 & 0 & 5 & 1 \\ 1 & 4 & 1 & 2 & 3 & 5 \\ 4 & 2 & 2 & 6 & 4 & 4 \end{pmatrix}$$

$$g = \begin{pmatrix} 0 & 5 & 1 & 4 & 0 & 4 \\ 6 & 4 & 0 & 6 & 0 & 6 \\ 6 & 4 & 5 & 5 & 5 & 5 \\ 1 & 1 & 4 & 3 & 2 & 5 \\ 0 & 2 & 2 & 6 & 4 & 3 \\ 1 & 5 & 6 & 4 & 2 & 6 \end{pmatrix}$$

$$g^{\phi^{-1}} = \begin{pmatrix} 5 & 4 & 6 & 3 \\ 0 & 6 & 3 & 3 \\ 1 & 5 & 3 & 4 \\ 3 & 2 & 3 & 4 \end{pmatrix}$$

Basis for U:

(1 0 0 6 6 4)

(0 1 0 2 3 4)

(0 0 1 1 0 6)

Basis for U^g:

(1 0 0 1 0 6)

(0 1 0 2 3 4)

(0 0 1 4 4 1)

Generators for K :

$$t = \begin{pmatrix} 1 & 1 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{pmatrix} \quad t^{(uv)^2} = \begin{pmatrix} 1 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{pmatrix} \quad t^{uv} = \begin{pmatrix} 1 & 0 & 0 & 1 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{pmatrix}$$

$$y = \begin{pmatrix} 6 & 1 & 5 & 3 & 5 & 2 \\ 2 & 5 & 5 & 4 & 5 & 0 \\ 0 & 6 & 6 & 0 & 5 & 1 \\ 1 & 6 & 0 & 3 & 0 & 3 \\ 4 & 1 & 3 & 1 & 4 & 0 \\ 3 & 4 & 0 & 6 & 0 & 3 \end{pmatrix}$$

$$y^{\phi^{-1}} = \begin{pmatrix} 1 & 2 & 3 & 5 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{pmatrix}$$

$$gy = \begin{pmatrix} 5 & 1 & 3 & 0 & 2 & 4 \\ 5 & 2 & 1 & 4 & 1 & 6 \\ 0 & 6 & 4 & 0 & 4 & 5 \\ 6 & 0 & 5 & 6 & 3 & 2 \\ 0 & 4 & 6 & 6 & 1 & 1 \\ 4 & 0 & 2 & 3 & 5 & 3 \end{pmatrix}$$

$$(gy)^{\phi^{-1}} = \begin{pmatrix} 5 & 0 & 0 & 0 \\ 0 & 6 & 3 & 3 \\ 1 & 0 & 6 & 2 \\ 3 & 1 & 5 & 5 \end{pmatrix}$$

We have reduced g to:

$$\begin{pmatrix} 6 & 0 & 3 & 4 & 5 & 4 \\ 3 & 4 & 5 & 0 & 2 & 2 \\ 0 & 6 & 5 & 1 & 4 & 4 \\ 5 & 1 & 6 & 3 & 0 & 1 \\ 5 & 6 & 6 & 3 & 0 & 1 \\ 3 & 1 & 4 & 1 & 2 & 1 \end{pmatrix}$$

Downstairs (which we can't see):

$$\begin{pmatrix} 5 & 0 & 0 & 0 \\ 0 & 6 & 3 & 3 \\ 0 & 0 & 6 & 2 \\ 0 & 1 & 5 & 5 \end{pmatrix}$$

$$K_1^{g^{\phi^{-1}}} = \begin{pmatrix} \alpha^{-1} & 0 & 0 & 0 \\ 0 & & & \\ 0 & & A^{-1} & \\ 0 & & & \end{pmatrix} \begin{pmatrix} 1 & 1 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{pmatrix} \begin{pmatrix} \alpha & 0 & 0 & 0 \\ 0 & & & \\ 0 & & A & \\ 0 & & & \end{pmatrix} = \begin{pmatrix} 1 & \alpha^{-1}a_1 & \alpha^{-1}a_2 & \alpha^{-1}a_3 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{pmatrix},$$

which is in K.

$$\alpha^{-1} g^{\phi^{-1}} = \begin{pmatrix} 1 & 5 & 4 & 2 \\ 0 & 4 & 2 & 2 \\ 3 & 1 & 2 & 5 \\ 2 & 6 & 2 & 5 \end{pmatrix},$$