LOCAL COORDINATES ON MODULAR CURVES (FIGURES)

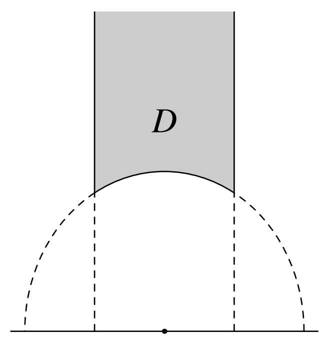

FIGURE 1. The fundamental domain for $\mathrm{SL}_2(\mathbf{Z})$

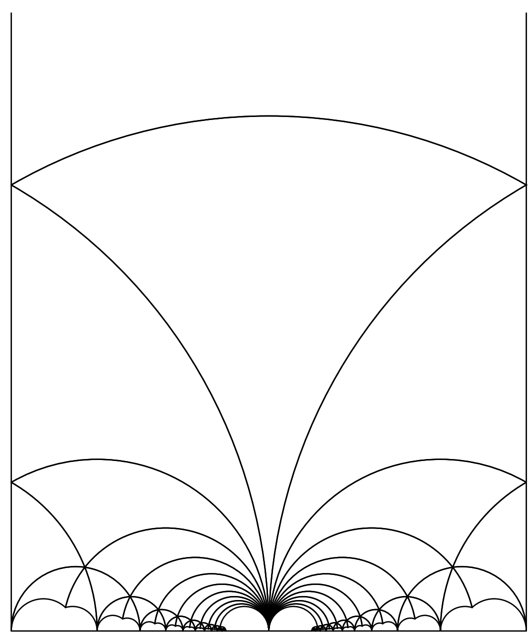

FIGURE 2. Some $\mathrm{SL}_2(\mathbf{Z})$-translates of $\mathcal{D}$

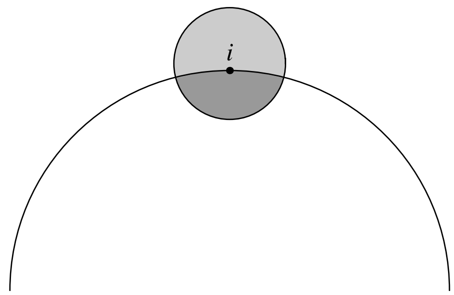

FIGURE 3. Pairwise equivalence about i

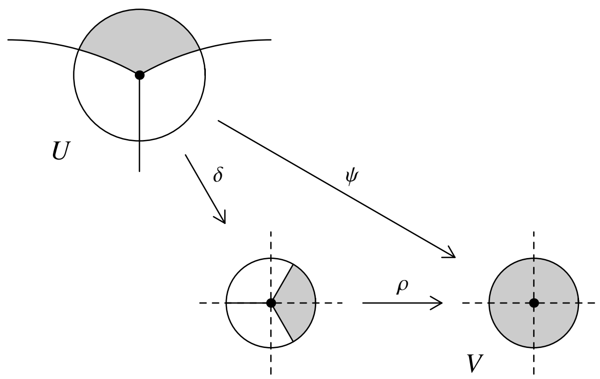

FIGURE 4. Local coordinates at an elliptic point

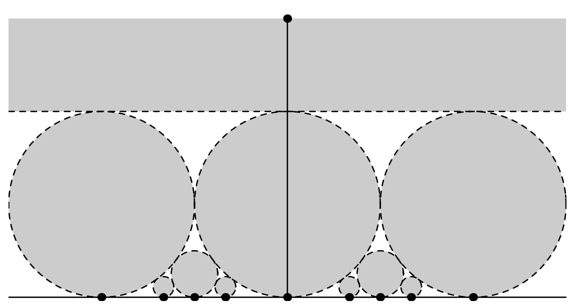

FIGURE 5. Neighborhoods of ∞ and of some rational points

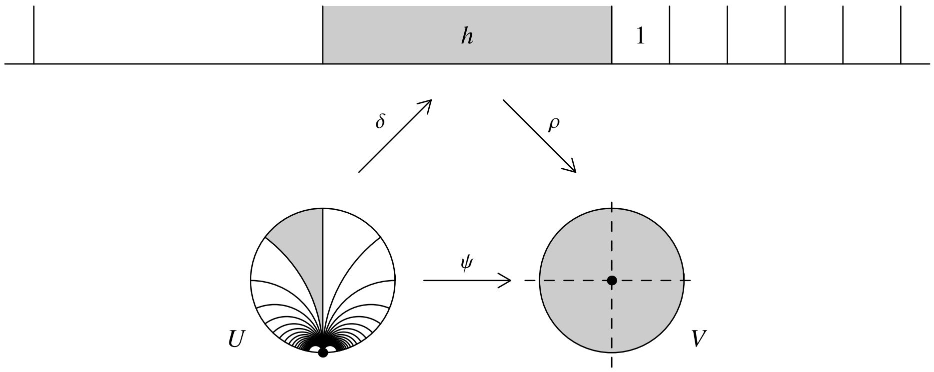

FIGURE 6. Local coordinates at a cusp

$\pi : \mathcal{H}^* \longrightarrow X(\Gamma)$ is natural projection. $U \subset \mathcal{H}^*$ is a neighborhood containing at most one elliptic point or cusp. The local coordinate $\varphi : \pi(U) \xrightarrow{\sim} V$ satisfies $\varphi \circ \pi = \psi$ where $\psi : U \longrightarrow V$ is a composition $\psi = \rho \circ \delta$.	
About $\tau_0 \in \mathcal{H}$:	About $s \in \mathbf{Q} \cup \{\infty\}$:
The straightening map is $z = \delta(\tau)$ where $\delta = \begin{bmatrix} 1 & -\tau_0 \\ 1 & -\overline{\tau}_0 \end{bmatrix}$, $\delta(\tau_0) = 0$. $\delta(U)$ is a neighborhood of 0 in $\mathbf{C}$.	The straightening map is $z = \delta(\tau)$ where $\delta \in \mathrm{SL}_2(\mathbf{Z})$, $\delta(s) = \infty$. $\delta(U)$ is a neighborhood of ∞ in $\mathcal{H}^*$.
The wrapping map is $q = \rho(z)$ where $\rho(z) = z^h$, $\rho(0) = 0$ with period $h = \lvert\{\pm I\}\Gamma_{\tau_0}/\{\pm I\}\rvert$. $V = \rho(\delta(U))$ is a neighborhood of 0.	The wrapping map is $q = \rho(z)$ where $\rho(z) = e^{2\pi i z/h}$, $\rho(\infty) = 0$ with width $h = \lvert\mathrm{SL}_2(\mathbf{Z})_s/\{\pm I\}\Gamma_s\rvert$. $V = \rho(\delta(U))$ is a neighborhood of 0.

FIGURE 7. Local coordinates on $X(\Gamma)$

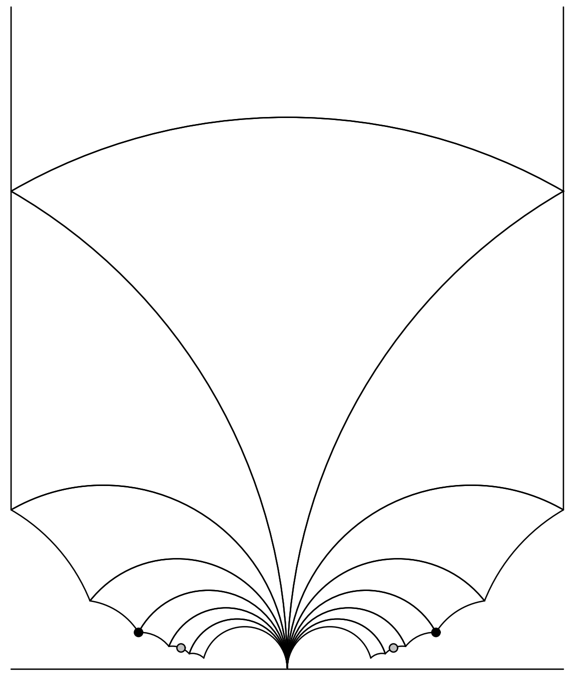

FIGURE 8. Fundamental domain for $\Gamma_0(13)$