Geodesics in Hyperbolic Geometry

November-11-08
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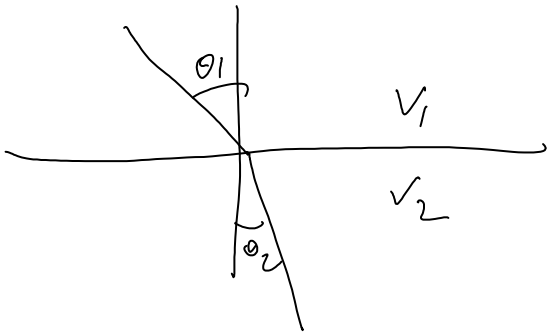
Snell's law:

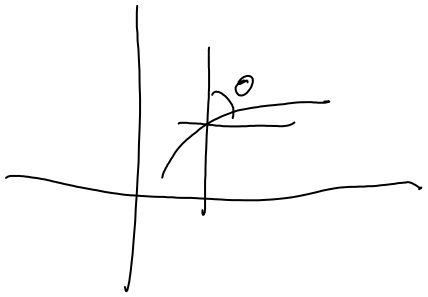
$$\frac{\sin\theta_1}{\sin\theta_2} = \frac{v_1}{v_2}$$



or

$$\frac{\sin\theta_1}{v_1} = \frac{\sin\theta_2}{v_2} \quad \text{or} \quad \frac{\sin\theta}{v} = C$$

$$\text{or } \frac{v}{\sin\theta} = C$$



$V = y$

$$y' = \frac{\cos\theta}{\sin\theta} = \frac{\sqrt{1-\sin^2\theta}}{\sin\theta}$$

$$(\sin\theta)y' = \sqrt{1-\sin^2\theta}$$

$$\sin^2\theta (y')^2 = 1 - \sin^2\theta$$

$$\sin^2\theta (1+y'^2) = 1$$

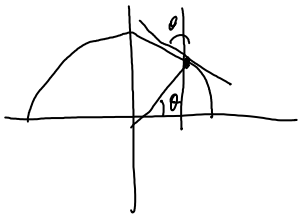
$$\sin\theta = \sqrt{\frac{1}{1+(y')^2}}$$

$$\Rightarrow C = \frac{y}{\sqrt{\frac{1}{1+(y')^2}}} = y\sqrt{1+(y')^2}$$

$\frac{v}{\sin\theta} = C$ $\quad V = y$ $\quad \sin t, \cos t$

$$\frac{\dot{y}}{\dot{x}} = \frac{\cos\theta}{\sin\theta} = \frac{\cos\theta}{cy}$$

$$\frac{\cos t}{-\sin t} =$$



$\frac{\sin\theta}{\sin\theta} = C$ ✓