

Coordinate System

$$(x, y)$$

Metric Tensor

$$g = \begin{pmatrix} \frac{1}{y^2} & 0 \\ 0 & \frac{1}{y^2} \end{pmatrix}$$

Geodesic Equations

$$\begin{aligned} \ddot{x} - \frac{2}{y} \dot{x}\dot{y} &= 0 \\ \ddot{y} + \frac{1}{y} \dot{x}^2 - \frac{1}{y} \dot{y}^2 &= 0 \end{aligned}$$

Christoffel Symbols (non-zero)

$$\Gamma_{xy}^x = -\frac{1}{y}$$

$$\Gamma_{yx}^x = -\frac{1}{y}$$

$$\Gamma_{xx}^y = \frac{1}{y}$$

$$\Gamma_{yy}^y = -\frac{1}{y}$$

Riemann Curvature Tensor (non-zero components)

$$R_{yxy}^x = -\frac{1}{y^2}$$

$$R_{yyx}^x = \frac{1}{y^2}$$

$$R_{xxy}^y = \frac{1}{y^2}$$

$$R_{xyx}^y = -\frac{1}{y^2}$$

Ricci Tensor (non-zero components)

$$R_{xx} = -\frac{1}{y^2}$$

$$R_{yy} = -\frac{1}{y^2}$$

Ricci Scalar

$$R = -2$$

Einstein Tensor (non-zero components)

none