Hill Climbing Robot System Specifications

State: $\begin{bmatrix} x \\ y \end{bmatrix}$

Control: $\begin{bmatrix} u \\ \theta \end{bmatrix}$

System Dynamics:
Hill Terrain: $h(x, y) = 3y + \sin(x + xy)$

$$\begin{bmatrix} \dot{x} \\ \dot{y} \end{bmatrix} = \begin{bmatrix} u \cdot \dfrac{\partial h/\partial x \cdot cos\theta - \partial h/\partial y \cdot sin\theta}{\sqrt{(\partial h/\partial y)^2 + (\partial h/\partial x)^2}} \\ u \cdot \dfrac{\partial h/\partial x \cdot sin\theta + \partial h/\partial y \cdot cos\theta}{\sqrt{(\partial h/\partial y)^2 + (\partial h/\partial x)^2}} \end{bmatrix}$$