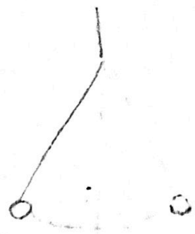
$$\frac{\partial S}{\partial t} + H\left(q_1 \ldots q_n, \frac{\partial S}{\partial q_1}, \ldots \frac{\partial S}{\partial q_n}, t\right) = 0$$



$$S = -Et + \int \sqrt{2mL^2(E + mgL\cos\varphi)}\, d\varphi$$

$$x = L\sin\varphi$$

$$y = L\cos\varphi$$

$$\dot{x} = L\cos\varphi \cdot \dot{\varphi}$$

$$\dot{y} = -L\sin\varphi \cdot \dot{\varphi}$$

$$H = p_\varphi \cdot \dot{\varphi} - L$$

$$p_\varphi = \frac{\partial L}{\partial \dot{\varphi}}$$

$$L = T - \Pi$$

$$\Pi = mg(L - \cos\varphi \cdot L)$$

$$T = \frac{m v^2}{2} =$$

$$v = \sqrt{\dot{x}^2 + \dot{y}^2} = L\dot{\varphi}$$

$$= \frac{mL^2\dot{\varphi}^2}{2}$$

$$L = \frac{mL^2\dot{\varphi}^2}{2} - mg(L - \cos\varphi \cdot L) = \frac{mL^2\dot{\varphi}^2}{2} - mgL(1 - \cos\varphi)$$

$$p_\varphi = mL^2\dot{\varphi}$$

$$H = mL^2\dot{\varphi}^2 - \frac{mL^2\dot{\varphi}^2}{2} + mgL(1 - \cos\varphi) = \frac{mL^2\dot{\varphi}^2}{2} + mgL(1 - \cos\varphi)$$

$$\frac{\partial S}{\partial t} = -E + \int \frac{m^2L^3 \cdot g(-\sin\varphi) \cdot \dot{\varphi}}{\sqrt{2mL^2(E + mgL\cos\varphi)}}\, d\varphi$$

$$-E + \int \frac{m^2L^3 g(-\sin\varphi) \cdot \dot{\varphi}}{\sqrt{2mL^2(E + mgL\cos\varphi)}}\, d\varphi + \frac{mL^2\dot{\varphi}^2}{2} + mgL(1 - \cos\varphi) = 0$$