

$$\frac{dx}{dt} = \frac{\partial \omega}{\partial p}$$

$$\frac{dp}{dt} = -\frac{\partial \omega}{\partial x}$$

$$\frac{dy}{dt} = \frac{\partial \omega}{\partial q}$$

$$\frac{dq}{dt} = -\frac{\partial \omega}{\partial y}$$