

正準2形式

$$\omega = dp \wedge dq$$

ハミルトニアンの変分

$$dH = \frac{\partial H}{\partial q} dq + \frac{\partial H}{\partial p} dp$$

正準方程式

$$\begin{cases} \dot{q} = \frac{\partial H}{\partial p} \\ \dot{p} = -\frac{\partial H}{\partial q} \end{cases}$$

リウヴィル演算子

$$\begin{aligned} \frac{d}{dt} A(q, p) &= \frac{\partial A}{\partial q} \dot{q} + \frac{\partial A}{\partial p} \dot{p} \\ &= \left( \dot{q} \frac{\partial}{\partial q} + \dot{p} \frac{\partial}{\partial p} \right) A \\ &= iLA \end{aligned}$$

$$\langle \omega, iL \rangle = -dH \longleftrightarrow$$