$$I = \int_{t_1}^{t_2} \left(L(q, \dot{q}) + F \right) dt \qquad\qquad I = \int_{t_1}^{t_2} L\left(Q, \dot{Q} \right) dt$$

$$I = \int_{t_1}^{t_2} \left(p\dot{q} - H(q, p) + F \right) dt \qquad\qquad I = \int_{t_1}^{t_2} \left(P\dot{Q} - H(q, p) \right) dt$$

$$\boxed{\delta I = 0}$$

$$\begin{vmatrix} \dfrac{\partial Q}{\partial q} & \dfrac{\partial Q}{\partial p} \\[2mm] \dfrac{\partial P}{\partial q} & \dfrac{\partial P}{\partial p} \end{vmatrix} = 1$$

$$\boxed{\delta I = 0}$$

$$\begin{cases} \dot{q} = \dfrac{\partial H}{\partial p} \\[4mm] \dot{p} = -\dfrac{\partial H}{\partial q} \end{cases} \qquad\longleftrightarrow\qquad \begin{cases} \dot{Q} = \dfrac{\partial H}{\partial P} \\[4mm] \dot{P} = -\dfrac{\partial H}{\partial Q} \end{cases}$$