

$$\frac{d}{dt} \int D\eta \overline{\Phi[\eta]} \frac{\delta}{\delta \eta(t)} \Phi[\eta]$$

$$= \frac{d}{d\varepsilon} \int D\eta \overline{\Phi[\eta]} \frac{\delta}{\delta \eta(t+\varepsilon)} \Phi[\eta] \Big|_{\varepsilon=0}$$

置換積分: $\eta(t) = \xi(t - \varepsilon)$, $\int D\eta = \int D\xi$

$$= \frac{d}{d\varepsilon} \int D\xi \overline{\Phi[\xi']} \frac{\delta}{\delta \xi(t)} \Phi[\xi'] \Big|_{\varepsilon=0} \quad ; \xi'(t) \equiv \xi(t - \varepsilon)$$

$$= \int D\xi \overline{\left(\frac{d}{d\varepsilon} \Phi[\xi'] \Big|_{\varepsilon=0} \right)} \frac{\delta}{\delta \xi(t)} \Phi[\xi]$$

$$+ \int D\xi \overline{\Phi[\xi]} \frac{\delta}{\delta \xi(t)} \left(\frac{d}{d\varepsilon} \Phi[\xi'] \Big|_{\varepsilon=0} \right)$$

$$= \frac{\alpha}{-i\hbar} \int D\xi \int dt' \left\{ \left[\frac{1}{2m} \left[\frac{i\hbar}{\alpha} \frac{\delta}{\delta \xi(t')} \right]^2 + V(\xi(t')) \right] \overline{\Phi[\xi]} \right\} \frac{\delta}{\delta \xi(t)} \Phi[\xi]$$

$$+ \frac{\alpha}{i\hbar} \int D\xi \overline{\Phi[\xi]} \frac{\delta}{\delta \xi(t)} \int dt' \left[\frac{1}{2m} \left[\frac{-i\hbar}{\alpha} \frac{\delta}{\delta \xi(t')} \right]^2 + V(\xi(t')) \right] \Phi[\xi]$$

$$= \frac{\alpha}{i\hbar} \int D\xi \overline{\Phi[\xi]} \left(- \int dt' V(\xi(t')) \frac{\delta}{\delta \xi(t)} + \frac{\delta}{\delta \xi(t)} \int dt' V(\xi(t')) \right) \Phi[\xi]$$

