

左辺の変形

$$\begin{aligned}
 & \int Dp \, i \int dt \, \dot{p}(t) \chi(t) \exp \int d\tau [f(p(\tau), \tau) + i p(\tau) \chi(\tau)] \\
 &= \int Dp \left[\exp \int d\tau f(p(\tau), \tau) \right] \\
 & \quad \times \left[\int dt \, \dot{p}(t) \frac{\delta}{\delta p(t)} \right] \exp \int d\tau' i p(\tau') \chi(\tau') \\
 & \quad \downarrow \delta \dot{p}(t) / \delta p(t) = 0 \\
 &= \int Dp \left[\exp \int d\tau' i p(\tau') \chi(\tau') \right] \\
 & \quad \times \left[- \int dt \, \dot{p}(t) \frac{\delta}{\delta p(t)} \right] \exp \int d\tau f(p(\tau), \tau) \\
 &= \int Dp \left[\exp \int d\tau' i p(\tau') \chi(\tau') \right] \\
 & \quad \times \left[- \int dt \, \dot{p}(t) \frac{\partial f(p(t), t)}{\partial p(t)} \right] \exp \int d\tau f(p(\tau), \tau) \\
 &= \int Dp \left[- \int dt \, \dot{p}(t) \frac{\partial f(p(t), t)}{\partial p(t)} \right] \\
 & \quad \times \exp \int d\tau [f(p(\tau), \tau) + i p(\tau) \chi(\tau)]
 \end{aligned}$$