

## Debug session

$$\begin{aligned}
 & \cos(\omega t)\hat{x} + \frac{\sin(\omega t)\hat{p}}{\omega} \tag{1} \\
 & -\omega \sin(\omega t)\hat{x} + \cos(\omega t)\hat{p} \\
 & \left( \hat{x}^2, \frac{i \frac{d}{dt}\rho(t)}{2\rho(t)} \right) \\
 & \left( \hat{p}\hat{x} + \hat{x}\hat{p}, -\frac{i \log(\rho(t))}{2} \right) \\
 & -\frac{\omega^2 \sin^2(\omega t)}{2} + \frac{\omega^2 \cos^2(\omega t)}{2} - i\omega \sin(\omega t) \cos(\omega t) \\
 & \frac{\omega^2 \hat{x}^2}{2} + \frac{\hat{p}^2}{2} + \frac{\frac{d}{dt}\rho(t)\hat{p}\hat{x}}{2\rho(t)} + \frac{\frac{d}{dt}\rho(t)\hat{x}\hat{p}}{2\rho(t)} + \frac{\frac{d^2}{dt^2}\rho(t)\hat{x}^2}{2\rho(t)} \\
 & -\frac{\log(\rho(t))^9}{362880} + \frac{\log(\rho(t))^8}{40320} - \frac{\log(\rho(t))^7}{5040} + \frac{\log(\rho(t))^6}{720} - \\
 & \frac{\log(\rho(t))^5}{120} + \frac{\log(\rho(t))^4}{24} - \frac{\log(\rho(t))^3}{6} + \frac{\log(\rho(t))^2}{2} - \log(\rho(t)) + 1 \\
 & \frac{\omega^2 \rho^2(t)}{2} + \frac{\rho(t) \frac{d^2}{dt^2}\rho(t)}{2} + \frac{\frac{d}{dt}\rho(t)}{\rho(t)} + \frac{1}{2\rho^2(t)}
 \end{aligned}$$