

32. Calculate the transition matrix elements $G(x, t; y, 0)$ for the

- (a) free particle
- (b) harmonic oscillator

with the help of energy eigenfunctions.

33. Check the Wigner transformation for $A_W = p^m x^n$ and $\hat{A} = \frac{1}{2^n} \sum_{k=0}^n \binom{n}{k} \hat{x}^k \hat{p}^m \hat{x}^{n-k}$.

34. Show that for $\hat{H} = \frac{1}{2m} \left(\hat{\vec{p}} - \frac{e}{c} \hat{\vec{A}}(\hat{\vec{x}}) \right)^2 + \hat{V}(\hat{\vec{x}})$ the Weyl symbol is given by $H_W = \frac{1}{2m} \left(\vec{p} - \frac{e}{c} \vec{A}(\vec{x}) \right)^2 + V(\vec{x})$.

35. Prove that $\int_0^t W(t') dW(t') = \frac{1}{2} W(t)^2 - \frac{1}{2} t$.

36. Prove that $\int_0^t G(t') dW(t')^2 = \int_0^t G(t') dt'$ for G being a non anticipating function of t .