$$\hat{\psi}(\underline{x}) = \sum_{\nu=1}^{\infty} \psi_\nu(\underline{x})\, a_\nu \quad \Big| \quad \hat{\psi}^+(\underline{x}) = \sum_{\mu=1}^{\infty} \psi_\mu^*(\underline{x})\, a_\mu^+$$

$$\hat{N} = \sum_{\lambda=1}^{\infty} a_\lambda^+ a_\lambda = \sum_{\lambda=1}^{\infty} \int \psi_\lambda(\underline{x})\, \hat{\psi}^+(\underline{x})\, d\tau \int \psi_\lambda^*(\underline{x}')\, \hat{\psi}(\underline{x}')\, d\tau'$$

$$= \int \underbrace{\sum_{\lambda=1}^{\infty} \psi_\lambda(\underline{x})\, \psi_\lambda^*(\underline{x}')}_{= \delta(\underline{x} - \underline{x}')}\, \hat{\psi}^+(\underline{x})\, \hat{\psi}(\underline{x}')\, d\tau\, d\tau'$$

$$= \int \delta(\underline{x} - \underline{x}')\, \hat{\psi}^+(\underline{x})\, \hat{\psi}(\underline{x}')\, d\tau\, d\tau' = \int \hat{\psi}^+(\underline{x})\, \hat{\psi}(\underline{x})\, d\tau$$

$$A_{\lambda\mu} = \int \psi_\lambda^*(\underline{x})\, A(\underline{x})\, \psi_\mu(\underline{x})\, d\tau$$