$$\boxed{\langle \hat{A}^\dagger \phi | \psi \rangle = \langle \phi | \hat{A} \psi \rangle}$$

$$\langle \phi | \hat{A} | \psi \rangle$$

$V = L^2$

$|f\rangle = A^\dagger \phi\rangle$

$\langle f | \psi \rangle$

$\hat{A}$

$|\psi(x)\rangle$

$\int \phi^*(x) \psi(x) \, dx$

$$\boxed{(A^\dagger |\phi\rangle)^\dagger |\psi\rangle}$$

$$\boxed{\langle \phi | A | \psi \rangle}$$

$\frac{d}{dx} f(x)$

$\hat{A}^\dagger$

$B = A^\dagger$ . . . $B^\dagger$

$\langle A^\dagger \phi | \psi \rangle = \langle \phi | A \psi \rangle$ $\quad |^*$

$\langle \psi | A^\dagger \phi \rangle = \langle A \psi | \phi \rangle$ $\quad \psi \leftrightarrow \phi$

$\langle A \phi | \psi \rangle = \langle \phi | A^\dagger \psi \rangle$

$\hat{A}, \hat{B}$

$$\boxed{(\hat{A}, \hat{B}) = \mathrm{Tr}(\hat{A}^{+}\hat{B})}$$

$U^{+}U = U$, Σ

- $(\hat{B}, \hat{A}) = \mathrm{Tr}(\hat{B}^{+}\hat{A}) = \mathrm{Tr}(AB^{+}) =$

AB^{+}

$+ = *$

$$\mathrm{Tr}(A^{+}) = (\mathrm{Tr}\,A)^{*}$$

$$\left(\mathrm{Tr}\left((AB^{+})^{*}\right)\right)^{*} = \mathrm{Tr}(BA^{+})^{*}$$

$$= \mathrm{Tr}(A^{+}B)^{*} = (A, B)^{*}$$

- $(\hat{A}, c_1\hat{B}_1 + c_2\hat{B}_2)$

$$= \mathrm{Tr}\left(A^{+}(c_1B_1 + c_2B_2)\right) = \mathrm{Tr}(c_1A^{+}B_1 + c_2A^{+}B_2)$$

$$= \mathrm{Tr}(c_1A^{+}B_1) + \mathrm{Tr}(c_2A^{+}B_2) = c_1\mathrm{Tr}(A^{+}B_1) + c_2\mathrm{Tr}(A^{+}B_2)$$

- $(\hat{A}, \hat{A}) \geq 0$ $\quad (\hat{A}, \hat{A}) = \mathrm{Tr}(A^{+}A)$

- $\mathrm{Tr}\,C \equiv \sum_i c_{ii}$ $\quad C = A^{+}A$

$$\underline{c_{ij}} = \sum_k (A^{+})_{ik} A_{kj} = \underline{\sum_k A^{*}_{ki} A_{kj}} \quad i = j$$

$(A^{+})_{ik} \equiv A^{*}_{ki}$

$$(\hat{A}, \hat{A}) \equiv \mathrm{Tr}\,C = \sum_i \sum_k A^{*}_{ki} A_{ki} \equiv \sum_{ik} |A_{ki}|^{2} \geq 0$$

Matice 2×2 ... LVP $\begin{pmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{pmatrix}$

$\begin{pmatrix} 1 & 0 \\ 0 & 0 \end{pmatrix}$ $\begin{pmatrix} 0 & 1 \\ 0 & 0 \end{pmatrix}$ $\begin{pmatrix} 0 & 0 \\ 1 & 0 \end{pmatrix}$ $\begin{pmatrix} 0 & 0 \\ 0 & 1 \end{pmatrix}$

Pauliho matice

$\hat{I} = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ $\quad \overset{x_1}{\hat{\sigma}_x = \begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}}$ $\quad \overset{x_2}{\hat{\sigma}_y = \begin{pmatrix} 0 & -i \\ i & 0 \end{pmatrix}}$ $\quad \overset{x_3}{\hat{\sigma}_z = \begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix}}$

$\cancel{\sigma_1}$ $\hat{\sigma}_0$ $\quad \sigma_1 \quad \sigma_2 \quad \sigma_3$

$$(\sigma_i, \sigma_j) \equiv Tr\{\sigma_i \sigma_j\} =$$

$$\boxed{(\sigma_i, \sigma_i) = Tr\{\sigma_i^2\} = Tr\{I\} = 2} \quad \sigma_i^2 = 1$$

$$(\sigma_i, \sigma_j) = Tr(I\sigma_i) = 0$$

$i \quad j$

$$(\sigma_i, \sigma_j) = 2\delta_{ij}$$