

F Summary of Dirac's notation:

	Normal 3D space	Hilbert Space
Vectors	\vec{i}	$ \psi\rangle$
Dual Space	\vec{i}^\dagger	$\langle\psi $
Vector representations	$\vec{r} = a\hat{i} + b\hat{j} + c\hat{k}$	$ \psi\rangle = \{\sum_{l=1}^n l\rangle \langle l \} \psi\rangle$
		OR
		$\int dx x\rangle \langle x \psi\rangle$
	$\vec{r} \equiv \begin{pmatrix} a \\ b \\ c \end{pmatrix} \equiv \begin{pmatrix} \vec{i}^\dagger \vec{r} \\ \vec{j}^\dagger \vec{r} \\ \vec{k}^\dagger \vec{r} \end{pmatrix}$	$ \psi\rangle \equiv \begin{pmatrix} \vdots \\ \langle x_1 \psi\rangle \\ \langle x_2 \psi\rangle \\ \langle x_3 \psi\rangle \\ \vdots \end{pmatrix}$
Matrix representations	$A \equiv \sum_{i=1}^3 \sum_{j=1}^3 A_{i,j} \vec{i} \vec{j}^\dagger$	$A \equiv \sum_{i,j} i\rangle \langle j A_{i,j}$
	$= \begin{pmatrix} A_{1,1} & A_{1,2} & A_{1,3} \\ A_{2,1} & A_{2,2} & A_{2,3} \\ A_{3,1} & A_{3,2} & A_{3,3} \end{pmatrix}$	A matrix with matrix element $A_{i,j}$
	$= \begin{pmatrix} \vec{i}^\dagger A \vec{i} & \vec{i}^\dagger A \vec{j} & \vec{i}^\dagger A \vec{k} \\ \vec{j}^\dagger A \vec{i} & \vec{j}^\dagger A \vec{j} & \vec{j}^\dagger A \vec{k} \\ \vec{k}^\dagger A \vec{i} & \vec{k}^\dagger A \vec{j} & \vec{k}^\dagger A \vec{k} \end{pmatrix}$	$A_{i,j} = \langle i A j \rangle$

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Vectors	\vec{i}	$ \psi\rangle$
Orthonormality of the vector space	$\vec{i} \cdot \vec{j} = \delta_{i,j}$	$\langle i j \rangle = \delta_{i,j}$ $\langle x x' \rangle = \delta(x - x')$
