A table of comparison (assuming the vector space is N-dimensional)

	Euclidean vector	Vector in quantum mechanics
notation	$\vec{v}$	$\vert v\rangle$, a state vector
addition	$\vec{w} = a\vec{u} + b\vec{v};\ a, b \in R$	$\vert w\rangle = a\vert u\rangle + b\vert v\rangle;\ a, b \in C$ (complex vector space)
expansion using basis vectors	$\vec{v} = \sum_{i=1}^{N} v_i \hat{e}_i$	$\vert v\rangle = \sum_{i=1}^{N} v_i \vert i\rangle$
dual vector,	transpose $\vec{v}^T \leftrightarrow \vec{v}$	bra vector $\langle v\vert \leftrightarrow \vert v\rangle$ ket vector
in component forms	$\vec{v}^T = (v_1, ..., v_N) \leftrightarrow \vec{v} = \begin{pmatrix} v_1 \\ \vdots \\ v_N \end{pmatrix}$	$\langle v\vert = (v_1^*, ..., v_N^*) \leftrightarrow \vert v\rangle = \begin{pmatrix} v_1 \\ \vdots \\ v_N \end{pmatrix}$
inner product	$\vec{u}^T \cdot \vec{v} \equiv \sum_{i=1}^{N} u_i v_i$ $\vec{u}^T \cdot \vec{v} = \vec{v}^T \cdot \vec{u}$	$\langle u\vert v\rangle \equiv \sum_{i=1}^{N} u_i^* v_i$ $\langle u\vert v\rangle = \langle v\vert u\rangle^*$
orthonormal basis and components of a vector	$\hat{e}_i^T \cdot \hat{e}_j = \delta_{ij}$ $v_i = \hat{e}_i^T \cdot \vec{v}$	$\langle i\vert j\rangle = \delta_{ij}$ $v_i = \langle i\vert v\rangle$
outer product	$\vec{u}\vec{v}^T$ becomes a N×N matrix $(\vec{u}\vec{v}^T)_{ij} \equiv \hat{e}_i \cdot \vec{u}\vec{v}^T \cdot \hat{e}_j = u_i v_j$	$\vert u\rangle\langle v\vert$ becomes an "operator" $(\vert u\rangle\langle v\vert)_{ij} \equiv \langle i\vert u\rangle\langle v\vert j\rangle = u_i v_j^*$
the associative property		$(\vert u\rangle\langle v\vert)\vert w\rangle = \vert u\rangle(\langle v\vert w\rangle) = \vert u\rangle\langle v\vert w\rangle$ (prove it!)
the completeness relation ("very" useful!)	$\vec{v} = \sum_{i=1}^{N} \hat{e}_i v_i$ $= \sum_{I=1}^{N} \hat{e}_i \hat{e}_i^T \cdot \vec{v}$ The equation above is valid for all $\vec{v}$ so we can remove $\vec{v}$ and simply write $\sum_{i=1}^{N} \hat{e}_i \hat{e}_i^T = 1$ (identity matrix)	$\vert v\rangle = \sum_{i=1}^{N} \vert i\rangle v_i$ $= \sum_{i=1}^{N} \vert i\rangle\langle i\vert v\rangle$ The equation is valid for all $\vert v\rangle$ so we can remove $\vert v\rangle$ and simply write $\sum_{i=1}^{N} \vert i\rangle\langle i\vert = 1$ (identity operator)
transformation of a vector, coordinate-dependent form	$M : \vec{v} \to \vec{v}' = M\vec{v}$ $v_i' = \sum_{j=1}^{N} M_{ij} v_j$	$\Omega : \vert v\rangle \to \vert v'\rangle = \Omega\vert v\rangle$ $\langle i\vert v'\rangle = \sum_{i=1}^{N} \langle i\vert\Omega\vert j\rangle\langle j\vert v\rangle$, or $v_i' = \sum_{i=1}^{N} \Omega_{ij} v_j$
Schwarz inequality	$\vert\vec{u} \cdot \vec{v}\vert^2 \le \vert\vec{u}\vert^2 \vert\vec{v}\vert^2$	$\vert\langle u\vert v\rangle\vert^2 \le \langle u\vert u\rangle\langle v\vert v\rangle$