#flo #inclass

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1 | learn by doing!

to remember:

qubit is a q&a, it will answer +1 or -1, qubit is the unit of info for quantum properties

when we are using complex components, we are distribution more information? because they have a complex and a real part?

we have to allow for a part to remain unobservable not the same thing ofc, cus that woudn't help, but mixed in!

- if you ignore the unobservable things, then the **system seems random.**

1.1 | notation

bra-ket notation, and the linalg notation.

linalg $|u\rangle = \begin{pmatrix}1\\0\end{pmatrix}$ $|d\rangle = \begin{pmatrix}0\\1\end{pmatrix}$

bra-ket $\sum_j \langle k|M|j\rangle \sigma_j = \sum_j \beta_j \langle k|j\rangle$ where $\langle k|M|j\rangle$ -> $\begin{pmatrix}k_1 & k_2\end{pmatrix}\begin{pmatrix}m_{11} & m_{12}\\ m_{21} & m_{22}\end{pmatrix}\begin{pmatrix}j_1\\j_2\end{pmatrix}$ in standard linalg notation

the vec $|u\rangle$ is a unit vector inside a sphere in two complex dimensions we multiply these unit vectors by matrices, which are like events/measurements?

we actully multiply by **unitary matricies** $\langle k|M|j\rangle$ will return a complex scalar of at most magnitude one, as the M stems from the unit vec inside the complex circle? but! this will **not** give us the `a` of the `qna`! don't get this confused.

$\begin{pmatrix}k_1 & k_2\end{pmatrix}\begin{pmatrix}m_{11} & m_{12}\\ m_{21} & m_{22}\end{pmatrix}\begin{pmatrix}j_1\\j_2\end{pmatrix}$ in standard linalg notation

unit vec to another unit vec is what a unitary matrix is? so when me multiply by u and d, we get out another basis vec? alright.

1.2 | postulates, for now

measurable stuff is represented by the operators L it also needs to be hermitian

any state vector has to have unit length

there is a distinction between the result of a measurement and what happens to the operator? doing something to a system -> we get an answer, and the state changes. this state is unobservable.

this "something" is multiplying by an **observable operator** what does that mean? i dont know!

and, pauli matricies are important? we will be using them a lot of which the only eigen values are +1/-1

we are constrained to the sphere so we are limited to only movement and rotation, not scaling!