Reminder: Need to understand vectors and operators

**Vector**

- Coordinates = Basis (orthonormal)
  - Components $(x, y, z)$ ($n=3$)
  - $n$ dimensional
  - Even $\infty$ dimensions: countable
  - Continuous $n = \mathbb{R}$

- Can be added
- Can multiply with scalar

**Vector Space**: Vectors (basis) + Scalar Field

- QM: $n = 2$ (coin), ... $\infty$ (continuous: particle $x$-axis)
- Basis: "fundamental states"
  - $n=2$: (heads; tails)
  - $n=\infty$: $\{ | x > | x \in \mathbb{R} \}$

- Scalar Field = $C$

**Scalar Product**: $\langle \psi_1 | \psi_2 \rangle$

= $\psi_1^* \psi_1 + \psi_2^* \psi_2 + \ldots$

- $\langle \psi | \psi \rangle$ describe same physical state for any state $| \psi >$ and
Example: infinite-dimensional vectors = functions f(x). Superposition, normalization,…