Basic Linear Algebra

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Norm

- for $x \in \mathbf{R}^n$ we define the (Euclidean) norm as

$$||x|| = \sqrt{x_1^2 + x_2^2 + \cdots + x_n^2} = \sqrt{x^\mathsf{T} x}$$

- $||x||$ measures length of vector from origin
- important properties
  - $||\alpha x|| = |\alpha| ||x||$
  - $||x + y|| = ||x|| + ||y||$
  - $||x|| \geq 0$
  - $||x|| = 0 \iff x = 0$