

THE NORMAL DISTRIBUTION

- Describes the distributions of many physical quantities (e.g. lengths, weights, measurements).

- Arises from the Central Limit Theorem.

- pdf of $X \sim N(\mu, \sigma)$: $f(x; \mu, \sigma) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{(x-\mu)^2}{2\sigma^2}}$

- cdf of $X \sim N(0, 1)$: $\Phi(x) = \int_{-\infty}^x \frac{1}{\sqrt{2\pi}} e^{-y^2/2} dy$

- mgf of $X \sim N(0, 1)$: $M_X(t) = e^{t^2/2}$

