



# CENTRAL LIMIT THEOREM

## Why

The sum of several independent and identically distributed random variables tends toward a normal distribution.<sup>1</sup>

## Result

**Prop. 1.** *Let  $(X, \mathcal{A}, \mu)$  be a probability space. Let  $(f_n)_n$  be a sequence of independent and identically distributed real-valued random variables on  $X$  with  $\mathbf{E}(f_n) = \mu < \infty$  and  $\text{var}(f_n) = \sigma^2 < \infty$  for all  $n$ . Define  $s_n = \sum_{i=1}^n f_i$ . For all real numbers  $t$ ,*

$$\lim_{n \rightarrow \infty} \mu \left( \left\{ x \in X \mid \frac{s_n(x) - n\mu}{\sigma\sqrt{n}} \leq t \right\} \right) = \Phi(t).$$

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<sup>1</sup>Future editions may modify this statement and further specify the word “tends”.



