Central Limit Theorem

1 Why

The sum of several independent and identically distributed random variables have a

2 Result

Proposition 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 $\mathbf{var}(f_n) = \sigma^2 < \infty$ for all n. Define $s_n = \sum_{i=1}^{n} f_i$. For all real numbers t,*

$$\lim_{n \to \infty} \mu\left(\left\{ x \in X \;\middle|\; \frac{s_n(x) - n\mu}{\sigma\sqrt{n}} \le t \right\}\right) = \Phi(t).$$