This is not a Hell continuity correction Markov Chains next more time: Markov Chains

\[ SE(S) = \sqrt{V(S)} \]

\[ \overline{\Delta} = \frac{1}{n} \sum_{i=1}^{n} W_i \]

\[ SE(\overline{\Delta}) = \frac{\sigma}{\sqrt{n}} \]

\[ E(S) = E\left( \sum_{i=1}^{n} W_i \right) = \sum_{i=1}^{n} E(W_i) = \sum_{i=1}^{n} \mu = \frac{\eta \mu}{\mu} = E(S) \]

\[ = 30,336.16 \]

\[ SE(S) = \sqrt{n \sigma^2} = \sigma \sqrt{n} \]
single most important frequentist inferential idea

\( \bar{X}_1, \ldots, \bar{X}_n \sim \text{some dist.} \)

\[ E(\bar{X}_i) = \mu_x, \quad V(\bar{X}_i) = \frac{\sigma^2}{\bar{n}} \]

for \( n \) large,

\[ \frac{1}{n} \sum_{i=1}^{n} X_i = \bar{X}_n \]

\( \bar{X}_1, \ldots, \bar{X}_n \sim \text{some dist.} \), \( (\sigma^2 < \infty) \)

unknown parameter \( \theta \) of interest

you can find an estimator \( \hat{\theta} \)

\( \theta \) such that

\( \hat{\theta} \) is a function of the \( \bar{X}_i \)

\( SE(\hat{\theta}) \) (PDF) dist. \( \bar{n} \) large
 Neyman was a rabid frequentist: for him, \( \theta \) is a fixed unknown constant and \( \hat{\theta}_n \) is a r.v.

Yet what people need; they need something like

\[
P_{\text{frequentist}} \left( \frac{1}{2} \leq \frac{\theta - \theta \hat{\text{se}}}{\theta \hat{\text{se}}} \leq \frac{\theta + \theta \hat{\text{se}}}{\theta \hat{\text{se}}} \right) = 0.95
\]

if \( A, B \) are fixed

\[
P_{\text{frequentist}} \left( \frac{A}{\theta} \leq \frac{\theta}{\theta} \leq \frac{B}{\theta} \right) = \text{undefined}
\]

if \( A, B \) are known

\[
P_{\text{frequentist}} \left( \frac{A}{\theta} \leq \frac{\theta}{\theta} \leq \frac{B}{\theta} \right) = \text{defined}
\]
Neyman's confidence trick

\[ .95 = P_{\theta} \left( \theta - 2 \hat{SE} < \hat{n} < \theta + 2 \hat{SE} \right) \]

rewrite \[ \hat{n} < \theta + 2 \hat{SE} \iff \theta - 2 \hat{SE} < \hat{n} \]

rewrite \[ \hat{n} > \theta - 2 \hat{SE} \iff \theta < \hat{n} + 2 \hat{SE} \]

\[ .95 = P_{\hat{n}} \left( \hat{n} - 2 \hat{SE} < \theta < \hat{n} + 2 \hat{SE} \right) \]

\[ \frac{A}{B} \quad \text{v.r.s} \]

Therefore let's agree to call

\[ \hat{n} \pm 2 \hat{SE} \]

an approximate 95% confidence interval for \( \theta \) (CI)
An approx.
95.5% CI
for $\theta$ is
$\hat{\theta}_n \pm 3.3\times SE$

An approx.
100(1-$\alpha$)%
CI is
$\hat{\theta}_n \pm t'_{(1-\alpha/2)} \times SE$

$95\%$ CI for $\theta$

$P_F(1 < \theta < 2) = .95$

is undefined

$95\%$ CI

$P_F(\text{hit}) = .95$

hit
miss
hit
hit = include $\theta$
Every estimator $\hat{\theta}_n$ is a r.v., so it has a variance $\sqrt{\text{Var}(\hat{\theta}_n)}$

$$\text{SE} = \sqrt{\text{Var}(\hat{\theta}_n)}$$

Unfortunately, $\sqrt{\text{Var}(\hat{\theta}_n)}$ often involves $\theta$

When this occurs, define $\text{SE}$ to be $\sqrt{\text{Var}(\hat{\theta}_n)}$ without $\theta$

$$\hat{\theta}_n$$

wherever $\theta$

appears

(10.43)

$99.9\%$ CI for $(\theta_c - \theta_T)$

\[ \text{when } 0 \text{ is not in CI, diff. is statistically significant} \]

\[ = \text{devil's advocate} \]