Conditioning II (Conf IV)

\[ y_1, y_2 \sim U(\theta \pm 1) \]

\[ f(y; \theta) \]

\[ \theta - 1 \quad \theta \quad \theta + 1 \]

Simple: \( \bar{y} \) sample average
1. \( \bar{y} \sim \text{Triangular}(\theta \pm 1) \)

75% Acceptance \( A(\theta) = (\theta - \frac{1}{2}, \theta + \frac{1}{2}) \)
75% Confidence \( C(\bar{y}) = (\bar{y} - \frac{1}{2}, \bar{y} + \frac{1}{2}) \)

If \( \bar{y} = 19.0 \) \( C(\bar{y}) = (18.5, 19.5) \)
y_1, y_2 \sim U(\Theta \pm 1)

1. \bar{y} \sim \text{Triangular}(\Theta \pm 1)

If \bar{y} = 19.0
- Data:
- \text{C}(\bar{y}) = (18.5, 19.5)

Cases
(a) \begin{align*}
y_1 &= 18.01 \\
y_2 &= 19.99
\end{align*}

(b) \begin{align*}
y_1 &= 18.99 \\
y_2 &= 19.01
\end{align*}

\Omega(19) = \{\Theta: 3\}

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Likelihood ($y_1, y_2$) Sample of 2 from $U(\theta \pm 1)$. pdf $= \frac{1}{2} \cdot \frac{1}{2} = \frac{1}{4}$...

$L(\theta; y_1, y_2) = c \cdot \frac{1}{4} \begin{cases} \text{if } & \theta - 1 < y_1 < \theta + 1, \quad \theta - 1 < y_2 < \theta + 1 \\ \theta \approx 0 \end{cases}$

Possible $\theta$ values ($y_{(2)}$, $y_{(1)} + 1$)

(Cf. $y$ marginal analysis?)

We know more

Centered at 19.

$19 \pm 1.5$ (75% CI)

Any idiot can examine the L(\theta) function and see what possible $\theta$ are!
Message: Better look at likelihood fn! Imperative! Must
Distribution Theory: Ex: \( y_1, y_2 \sim U(\theta \pm 1) \): A-S
formulas... Here: Geometry and use formulas.

Variables:
\[
\begin{align*}
\bar{y} &= \frac{y_1 + y_2}{2} \\
\alpha &= \frac{y_1 - y_2}{2}
\end{align*}
\]

Joint \((\bar{y}, \alpha)\) pdf:
\[
\frac{1}{4} \cdot \frac{1}{2} = \frac{1}{8}
\]

Marginal \(\alpha\) pdf:

Condcie \( y_1 | \alpha \)
Uniform
\( U(\theta \pm 1) \)
Marginal a pdf

Conduct y | α
Uniform

1) θ ± 1 - 1

Data y₁, y₂, know α = \frac{y₁ - y₂}{2} & It's distributed
\hat{\theta} - θ-free

"No info on θ"
- Tells us how accurate the inference

Want 75% CI
\bar{y} ± 75\% \{1 - 1\}

If saw before ??

Want Marg for a

Conduct for y | α

What is α = \frac{y₁ - y₂}{2}?

Info on how far data points are separate
Raw CI from data \( \{a\} \cup \{b\} \) = \( (18.5, 19.5) \)  

Possible values: Far apart

Bayesians shrug... "freq had heard of L"

Case (a) \( 19 \pm 0.0075 \)

Case (b) \( 19 \pm 0.7425 \)

Do you condition?

On info re accuracy available from data