AM115 Section 1: Review & New Challenge

AM115 Course Staff

Recap: Mosteller's World Series

What we learned last week:

- **Question:** How likely is the best team to win a 7-game series?
- **Model:** Binomial distribution (counting wins)
- **Parameter:** p = probability of winning single game
- **MLE:** $\widehat{p}$ = wins/games

Key insight: MLE finds the parameter most likely to generate observed data

MLE Recipe

Steps we followed:

1. Choose appropriate distribution for the phenomenon
2. Write likelihood: $L(\theta) = \prod f(x_i|\theta)$
3. Take log: $\log L(\theta)$
4. Differentiate and set to zero
5. Solve for $\widehat{\theta}$

Result: Parameter that maximizes probability of seeing our data

New Challenge: Battery Lifespans

Today's problem:

You need to choose between two laptop batteries with different prices.
Brand A: $45
Brand B: $65 (claims "40% longer life")
You have lifespan data from customer reviews.

Why is this different?

Think about it:

- World Series: counting wins out of 7 games
- Battery life: measuring time until failure

Key questions:

- What are we measuring?
- What kind of data is this?
- What assumptions make sense?

Let's Begin!

Turn to your handout and work through: - Part A: What kind of model do we need? - Part B: Quick calculations with the data - Part C: Derive the MLE for your chosen model

Different assumptions lead to different models - that's okay!