Ongoing Notes

2025-08-27

Definitions

Chapter 1

Four Fundamental Notions of Probability:

(1): Laplacian Probability

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- "Gambling"/"Classical" probability
- E.g., fair coins, dice, cards
- A material concept of probability
- Equally likely outcomes a typical result
- $Pr(E) \equiv \frac{|E|}{|S|}$, S sample space, E event, |A| size of set A
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(2): Relative Frequency

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- **"Not hypothetical limiting relative frequency"**
- A material concept of probability
- Probability is a direct consequence of physical realities, particularly for finite populations
- $Pr(A | B) = \frac{|A|}{|B|}$, where there is a finite number of objects in class B, and operation to
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(3): Hypothetical Limiting Relative Frequency

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- "What we usually mean when we refer to relative frequency or frequentist probability"
- A material concept of probability
- Can at least hypothetically repeat operation an infinite number of times
- $Pr(E) = \lim_{n \rightarrow \infty} (\frac{E_n}{n})$
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(4): Epistemic Probability - Any

Note: (1) through (3) use same notion of “operation”, “sample space”, and “events”

Operation: Observation, measurement, or selection

Sample Space: Set of possible Outcomes of an operation

Events: Subsets of elements in the sample space

Chapter 2

Reading Notes

Chapter 1

"Probability, no matter how it is conceptualized, obeys certain rules of behavior and, hence, mathematical results developed for probability do not depend on what exactly one believes it is." "Probability is **not a thing** but a **concept**."

Chapter 2