Chapter 4 review

Fred Azizi

2022-10-03

Measures of relative standing:

- Percentile: The value for which P percent are less than that value and $(100 - P)\%$ are greater than that value.
  - Location of percentile in ordered data: $L_P = (n+1)\frac{P}{100}$.

Measure of variability:

- Variance: $s^2 = \frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n-1}$.
- Standard deviation: $s = \sqrt{s^2}$.
- Coefficient of variation: $cv = \frac{s}{\bar{x}}$.

Measures of Linear Relationship:

- Covariance: $s_{xy} = \frac{\sum_{i=1}^{n}(x_i - \bar{x})(y_i - \bar{y})}{n-1}$.
- Correlation: $r = \frac{s_{xy}}{s_x s_y}$.
- Least Square line: $\hat{y} = b_0 + b_1 x$ where $b_1 = \frac{s_{xy}}{s_x^2}$ and $b_0 = \bar{y} - b_1 \bar{x}$.
- Coefficient of determination r^2.

Quick review (3)

Given a sample space $S = \{O_1, O_2, \ldots, O_k\}$

- $0 \leq P(O_i) \leq 1$ for each i
- $\sum_{i=1}^{k} P(O_i) = 1$.

Quick review (4)

- Mutually exclusive: No two outcomes can occur at the same time.
- Exhaustive events: All possible outcomes are included.
- Intersection of Events A and B: the event that occurs when both A and B occur.
- Union of Events A and B is the event that occurs when either A or B or **both** occur. It is denoted as A or B.
- Conditional Probability: The probability of event A given event B is
$$P(A \mid B) = \frac{P(A \text{ and } B)}{P(B)}$$
- Independent Events: A and B are said to be independent if $P(A \mid B) = P(A)$ or $P(B \mid A) = P(B)$.

- Complement Rule: $P\left(A^C\right) = 1 - P(A)$.
- Multiplication Rule: $P(A \text{ and } B) = P(B)P(A \mid B)$.
- Addition Rule: $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$