Probability Methods in Engineering

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Lecture 15

Sample Mean

The sample mean is an average value found in a sample.

- Perform random experiment n times to generate X
- Record the values as $x(1), x(2), \ldots, x(n)$
- A particular outcome x_k observed $N_k(n)$ times

- The mean (average) of a data set is found by adding all numbers in the data set and then dividing by the number of values in the set.
- The median is the middle value when a data set is ordered from least to greatest.
- The mode is the number that occurs most often in a data set.

Sample Mean

- Find the sample mean, median and mode for the following set of numbers: 12, 13, 14, 16, 17, 40, 43, 55, 56, 67, 68, 68 78, 79, 80, 81, 90, 99, 101, 102, 304, 306, 400, 401, 403, 404, 405

Examples

- A fair coin is tossed three times and the sequence of heads and tails is noted. The cost of tossing the fair coin thrice is 1.5 points. Let Y be the number of points obtained for each outcome such that 8 points are awarded for three heads, 1 point for two heads and no point otherwise. Find $E[Y]$. Is this experiment feasible?

Examples (cont.)

- The random experiment of tossing a coin three times and noting the sequence of heads and tails is performed 200 times by a person. Let Y be the number of points obtained for the outcome of experiment such that 8 points are awarded for three heads, 1 point for two heads and no point otherwise. The person got no heads 30 times, one heads 75 times, two heads 80 times and 15 times three heads. Find $<Y>_{200}$.

Examples (cont.)

- Let X be the number of times a message is transmitted until successfully arriving at the receiver. Suppose that X has a geometric distribution with success probability p. Find $E[X]$.