EE 497B

Probability and Random Processes for Electrical Engineers

Lecture 25

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Lecture 25 Topics

- Conditional PMF and PDF
- Conditional Expected Value

Conditional PMF

- ***Definition 2.9:*** Given the event *B*, with *P[B] > 0*, the conditional probability mass function of *X* is

$$P_{X|B}(x) = P[X = x \mid B]$$

- ***Theorem 2.17:*** For a random variable *X* with PMF $P_X(x)$ and an event $B \subset S_X$ with *P[B] > 0*

$$P_{X|B}(x) = P[X = x \mid B] = \frac{P[X = x, B]}{P[B]}$$

$$= \begin{cases} \dfrac{P_X(x)}{P[B]} & x \in B, \\ 0 & \text{otherwise} \end{cases}$$