Probability And Random Processes

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UG-2 ECE

Probability And Random Processes

Things to cover:

- Basics of prob
- Discrete RV
- Continuous RV
- Tail bounds, Limit Thm
- Random processes

Grading:

Assgn	25%
Q1	15%
Q2	15%
Im class q	5%
Midsem	20%
Endsem	30%

Books:

1) Papoulis
2) Bertsekas
3) Grimett

Frequency Approach

Perform exp n times

$$P(E) = \lim_{n \to \infty} \frac{n_E}{n}$$

n_E = no of times E case occurs

Axiomatic Approach:

Probability space: (Ω, F, P)

- Ω: Sample space
- F: Event space
- P: Probability space

Set Theory

$A \setminus B = \{ x \in A \text{ s.t. } x \notin B \}$ (-)

$A \cup B = \{ x \in A \text{ or } x \in B \}$ (+)

$(A \setminus B) \cup B = A \cup B$

Countably Infinite Sets

Eg: Rational Numbers

$S = \{x_1, x_2, \ldots\}$

Uncountably infinite

$\exists$ injection $N \to S$

$\nexists$ a bijection $N \to S$

Q- PT $\{0,1\}^{\infty}$ is uncountably infinite

Soln.- Cantor's diagonalization

① - $B_m = \{m, m+1, m+2 \dots\}$ $m \in N$

$\bigcap_{i=1}^{m} B_i$ is non empty set

$\bigcap_{i=1}^{\infty} B_i$ is non empty ?

→ PT

$$\left(\bigcup_{i=1}^{\infty} A_i\right)^c = \bigcap_{i=1}^{\infty} A_i^c$$