Lec 9/7

Wednesday, September 7, 2016 8:01 AM

Random Jas: (capitals)

X:5 → IR

P(X = x)

two types:

Discrete - listable

Continuous - unlistable (measures

X= gender of rawoming selected student X=0 it make, X=1 if famale P(x=i) = P(a founde is choser)

Ex: discrete or che?

- 1) Y= # of tree thous made in n shots Discretz. imX = 20,1,...,n3 (Binomial)
- 2) W= wait time in whole minutes of a call

 Discrete. in W= {0,1,...} (Poisson) pifit was [0, 10)
- 3) T = wait time at a busstop (cabs) Continuous. ImT = (0,8) or (0,8) (exponential)

4) Y = duration of a movie training (ontimors im y = (0, 00) or (0, 120)

(56al: determine probability distribution of an RY (CRY, DRY)

DRV first

Probability dist for a DRV lists all possible values and the probability that the DRV takes on those values.

Prob Pist . table . formla

$$P(x) := P(X = x)$$

p(x) := P(X = x) Probability mass function. (pmf)

properties of pmf;

.
$$0 \in P(x) \in I \quad \forall x \in Im X$$

$$\sum_{\chi \in imX} p(\chi) = |$$

Ex: Sum of two fair dice

$$\frac{\chi}{\rho(\mathcal{X})} \frac{2}{31} \frac{3}{16} \frac{4}{36} \frac{5}{36} \frac{6}{36} \frac{5}{36} \frac{4}{36} \frac{3}{36} \frac{2}{36} \frac{1}{31}$$

mutually exclusive

$$P(\text{roll } \alpha \ Z, 3, or 12) = P(X=2) + P(X=3) + P(X=12)$$

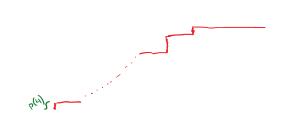
= $\frac{1}{36} + \frac{2}{36} + \frac{1}{36} = \frac{4}{31} = \frac{1}{9}$

CDF: comulative distribution function

$$F(x) := P(X \le x) = \sum_{\substack{t \in \text{im } X \\ t \le x}} P(X = t) \quad \forall x \in \mathbb{R}$$

- i) nondecreasing function
- 2) $\lim F(x) = 0$
- 3) lim F(x) = 1 X->20
- 4) F(x) is right continuous

from the dice example: $F(x) = 0 \quad \forall x < 2$



 $F(x) = 0 \qquad \forall x < 2$ $F(z) = \frac{1}{34} = P(X < 2) + P(z)$ $F(x) = \frac{1}{34} \qquad \forall x < 4 \quad 2 \le x < 3$

