LEZIONE 17

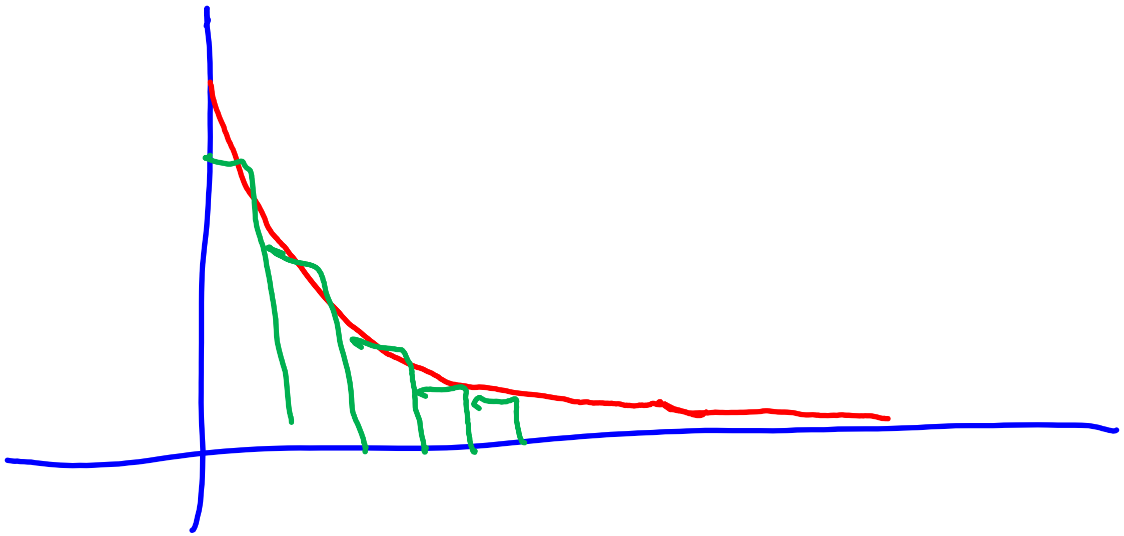
SLIDES: 4_Variabili Discrete 29-33
5_Variabili Continue 1-8

UNIFORME DISCRETA
IPERGEOMETRICA
BERNOULLI
BINOMIALE
POISSON

GEOMETRICA

LO DALLA SERIE GEOMETRICA

$$\frac{1}{1-r} = \sum_{n=0}^{\infty} r^n < \infty \qquad |r| < 1$$



$$\mathbb{E}[X] = \sum_{x=1}^{\infty} x\,\mathbb{P}[X=x] = \sum_{x=1}^{\infty} x\,(1-p)^{x-1}p = \frac{1}{p}$$

$$\sum_{x=1}^{\infty} x^2 (1-p)^{x-1} p = \mathbb{E}[X^2] = \underline{\mathrm{Var}(X)} + \underline{\mathbb{E}^2[X]}$$

$$= \frac{1-p}{p^2} + \frac{1}{p^2}$$

$$\mathrm{Var}(X) = \mathbb{E}[X^2] - \mathbb{E}^2[X]$$

$$= \frac{2-p}{p^2}$$

$X \sim Geom(0.2)$

① $\mathbb{P}[X = 15] = (1-0.2)^{15-1} \cdot 0.2$

② $\mathbb{P}[X > 10 \mid X > 4] = \mathbb{P}[X > 6] = (1-0.2)^{6}$

$n+m$

$n=6$

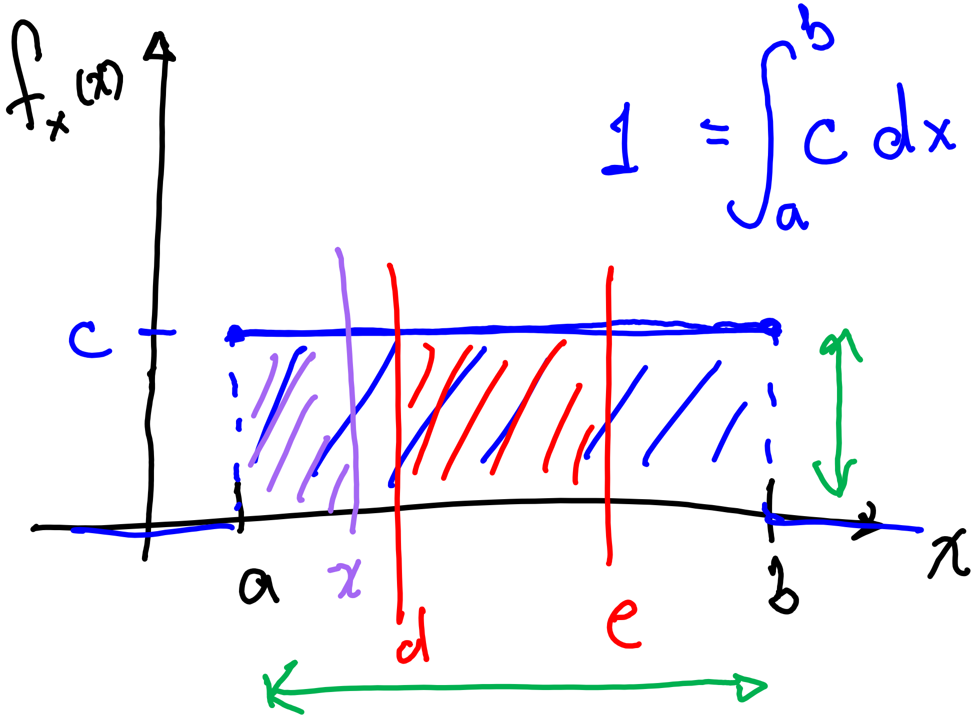
m

PER MANCANZA DI MEMORIA

UNIFORME CONTINUA

$X \sim U(a,b)\ ; \quad a < b$

$$f_X(x) = \begin{cases} c & \text{se } x \in (a,b) \\ 0 & \text{altrimenti} \end{cases}$$



$$1 = \int_a^b c\, dx = (b-a)\, c$$

$$\Leftrightarrow \quad c = \frac{1}{b-a}$$

$$\mathbb{P}[d \leq X \leq e] = (e-d)\, c = \frac{e-d}{b-a}$$

$$\mathbb{P}[X \leq x] = \frac{x-a}{b-a}$$

$$\mathbb{E}[X] = \frac{a+b}{2}$$

$$= \int_a^b \frac{x}{b-a}\, dx$$

$X \sim N(\mu, \sigma^2)$

$$f_X(x) = c \, e^{-\frac{(x-\mu)^2}{2\sigma^2}}$$

NON ESISTE UNA FUNZIONE CON DERIVATA

$$1 = \int_{-\infty}^{\infty} c \, e^{-\frac{(x-\mu)^2}{\sigma^2}} \, dx$$

$Z \sim N(0,1)$

$$f_Z(z) = c \, e^{-\frac{x^2}{2}}$$

$$c \int_{-\infty}^{\infty} e^{-x^2/2} \, dx$$

$$F_X(x) = \int_{-\infty}^{x} \frac{1}{\sqrt{2\pi}} e^{-t^2/2} \, dt$$