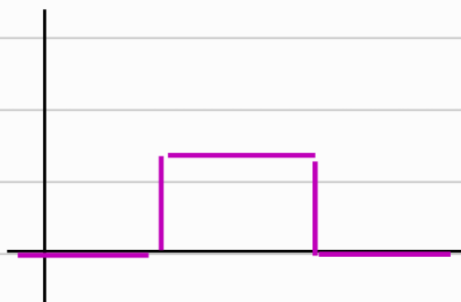


Distribuzione uniforme / 23-23



$$f(x) = \begin{cases} 0 & x < a \\ \text{costante} & a \leq x \leq b \\ 0 & x > b \end{cases}$$

$$\bullet \text{ pdf: } \int_a^b \underset{\text{costante}}{c} dx = x \Big|_a^b = b - a$$

allora la costante che rende la somma totale = 1

$$\text{e' } c = \frac{1}{b-a} = \text{costante}$$

$$\bullet F(x) = P(X \leq x) = \int_a^x f(t) dt$$

$$= \underset{x < a}{\emptyset} + \int_a^{\underset{x \leq b}{x}} \underset{\hookrightarrow \text{pdf}}{\frac{1}{b-a}} dt = \frac{x-a}{b-a}$$

$$F(x)_{\text{cumulata}} = \begin{cases} 0 & x < a \\ \frac{x-a}{b-a} & a \leq x \leq b \\ 1 & x > b \end{cases} \rightarrow$$

dopo $x=b$ la somma risultante e' 1, non sommo niente' altro e mi rimane 1

$$\bullet E[X] = \int_{-\infty}^{+\infty} \frac{x}{b-a} dx = \frac{1}{b-a} \frac{x^2}{2} \Big|_a^b = \frac{a+b}{2}$$

$$\bullet \text{Var}(X) = \underbrace{E[X^2] - (E[X])^2}$$

$$= \int_{-\infty}^{+\infty} x^2 \frac{1}{b-a} dx = \frac{1}{b-a} \left. \frac{x^3}{3} \right|_a^b$$

$$= \frac{1}{b-a} \left(\frac{b^3}{3} - \frac{a^3}{3} \right) = \frac{(b-a)^2}{12}$$