

DISTRIBUZIONE DI POISSON  $\sim \text{Pois}(\mu)$

$$\cdot f_{\text{Pois}}(k) = \frac{\mu^k}{k!} e^{-\mu}$$

$$\cdot S \sim \text{Binom}(n, \frac{\mu}{n}) \rightarrow \text{Pois}(\mu)$$

$$\cdot F_{\text{Pois}}(t) = P\{X \leq t\} = \sum_{k \leq t} f_{\text{Pois}}(k) = \sum_{k \leq t} \frac{\mu^k}{k!} e^{-\mu}$$

$$\cdot \text{Var}(x) = E(x)$$

$$\cdot E(x) = \mu$$

DISTRIBUZIONI UNIFORMI  $\sim \text{Unif}(\alpha, \beta)$

$$\cdot F(t) = \frac{t-\alpha}{\beta-\alpha}$$

$$\cdot X = \alpha + (\beta - \alpha) U \sim \text{Unif}(0, 1)$$

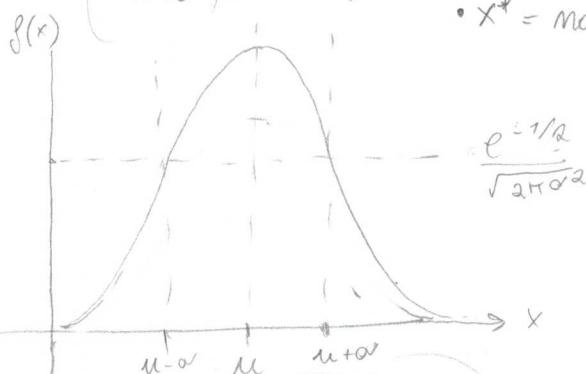
$$\cdot E(x) = \frac{\alpha+\beta}{2}$$

$$\cdot \text{Var}(x) = \left(\frac{\beta-\alpha}{2\sqrt{3}}\right)^2$$

\* TEMPO di ATESA UNIFORME ha una  
FOUTE MEMORIA

DISTRIBUZIONE NORMALE / DI GAUSS

$$f(x) = \frac{1}{\sqrt{2\pi\sigma^2}} e^{-\frac{(x-\mu)^2}{2\sigma^2}}$$



$$\cdot X = \mu + \sigma z \quad \text{con} \quad z = \text{Norm}(0, 1)$$

$$E(z) = 0$$

$$\text{Var}(z) = E(z^2) = 1$$

$$E(x) = \mu + \sigma E(z) = \mu$$

$$\text{Var}(x) = \sigma^2 \text{Var}(z) = \sigma^2$$

$$F_X(t) = P\{X \leq t\} = P\{X^* \leq z\} = \Phi(z)$$

$$P\{X^* \leq z\} = \int_{-\infty}^z f(x) dx = \Phi(z)$$

$$P\{X^* > z\} = 1 - \Phi(z)$$

$$P\{|X^*| \leq K\} = 2\Phi(K) - 1$$

PROCESSI DI POISSON  $X \sim \text{Pois}(\lambda) \rightarrow$  INTENSITÀ

•  $N_6$  = riarrivi in 6 mesi

• mi permette di lavorare su scale temporali

→ DISTRIBUZIONI ESPONENZIALI:  $T \sim \text{Exp}(\lambda)$

$$\cdot f_T(t) = 1 - e^{-\lambda t}$$

$$\cdot \text{MEDIA} = \text{DEV. ST.} = \frac{1}{\lambda}$$

$$\cdot F_T(t) = \lambda e^{-\lambda t}$$

$$\cdot \text{MEDIANA} = \frac{\ln(2)}{\lambda}$$

$$\cdot R_T(t) = e^{-\lambda t}$$

$$\cdot \text{VARIANZA} = E(T^2) - E^2(T) = \frac{1}{\lambda^2}$$

→ DISTRIBUZIONI GAMMA  $T_K \sim \text{Gamma}(K, \lambda)$

$$\cdot f_{T_K}(t) = \frac{\lambda^K}{(K-1)!} t^{K-1} e^{-\lambda t}$$

se uno  $P(T_3 \leq 2)$   
arrivo a  $j=2$

$$\cdot F_{T_K}(t) = 1 - \sum_{j=0}^{K-1} \frac{(\lambda t)^j}{j!} e^{-\lambda t}$$

$$\cdot E(T_K) = \frac{K}{\lambda}$$

QUANTILI NORMALI  $\sim \text{Norm}(\mu, \sigma^2)$

$$\cdot F(t) = \Phi\left(\frac{t-\mu}{\sigma}\right)$$

$$\cdot F^{-1}(w) = t = X_w = \mu + \sigma \Phi^{-1}(w)$$

$$z_w$$

APPROXIMAZIONE DI LAPLACE

Se  $S \sim \text{Binom}(n, p)$  con  $n, p$  grandi, allora

•  $S \approx \text{Norm}(np, npq)$  ricorda che è  $\sigma^2$

•  $P\{S=k\} = \Phi\left(\frac{k+\frac{1}{2}-np}{\sigma}\right) - \Phi\left(\frac{k-\frac{1}{2}-np}{\sigma}\right)$

• Ricorda: in ogni caso aggiungo + tolgo  $\frac{1}{2}$