EULERJEVA ENAČBA:

$$\frac{\partial f}{\partial y}-\frac{d}{dx}\left(\frac{\partial f}{\partial y'}\right)=0$$

$$f_y - f_{xy'} - f_{yy'}y' - f_{y'y'}y'' = 0$$

1.
$$f = f(x, y')$$
$$f_{y'} = C_1$$

2.
$$f = f(y, y')$$
$$f - y' f_{y'} = C_1$$

VERJETNOST, SLUČAJNE SPREMENLJIVKE

VSOTA ZDRUŽLJIVIH DOGODKOV:

$$P(A_1 + A_2) = P(A_1) + P(A_2)$$

$$P(A_1 + A_2 + A_3) = P(A_1) +$$

$$-P(A_1A_2) - P(A_1A_3) - P(A$$

PRODUKT DOGODKOV:

$$P(AB) = P(A)P(B|A) = P($$

$$P(A\overline{B}) = P(A) - P(AB)$$

POGOJ. VERJET. DOG. A GLEDE NA DOG. B:

k_B=št. ugodnih izidov za dogodek B v n poizskusih

$$P(B) = \frac{k_B}{n} \qquad P(AB) = \frac{k_{AB}}{n}$$

$$P(A|B) = P_B(A) = \frac{k_{AB}}{k_B} = \frac{k_{AB}}{k_B /$$

FORMULA POPOLNE VERJETNOSTI:

$$P(A) = \sum_i P(H_i)P_{H_i}(A) = \sum_i$$

BAYESOVA FORMULA:

$$P_A(H_i) = \frac{P(H_i)P_{H_i}(A)}{P(A)} = \frac{}{\sum_i}$$

DISKRETNE PORAZDELITVE:

1. ENAKOMERNA PORAZDELITEV

$$p_k = P(X = x_k) = konst.$$

$$p_k = \frac{1}{n}$$

2. BERNOULLIJEVA - BINOMSKA PORAZDELITEV

p-verjetnost da se zgodi dogodek

q=1-p

k-št. ugodnih izidov v n poizskusih

n-št. poizskusov (ponovitev)

veret. da je k ugodnih, n-k neugodnih:

$$P(n, p, k) = \binom{n}{k} p^k q^{n-k}$$

$$\binom{n}{k} = \frac{n!}{(n-k)!k!}$$

če k=M, iščemo najverjet. št. ugod. Izidov:

$$np - q \le M \le np + p$$

Laplaceova_ali_norm._aprok.ħ vel

$$P(n, p, k) \approx \frac{1}{\sqrt{2\pi npq}} e^{-(kn-p)^2/2npq}$$

Poissonova_aprok.ħ veliki_n,_mal

$$P(n, p, k) \approx \frac{(np)^k e^{-np}}{k!}$$

3. POISSONOVA PORAZDELITEV

$$p_k = \frac{a^k e^{-a}}{k!}, a > 0$$

$$F(x) = \begin{cases} 0 & ; x \le 0 \\ e^{-a}\sum_{k=0}^{m} \frac{a^k}{k!} & ; m < x \le m+1 \end{cases}$$

4. PASCAOVA PORAZDELITEV

$$p_k = P(X = x_k) = \binom{k-1}{m-1} p^m (1-p)^{k-m}, k = m, m+1, \ldots$$

Geometrijska_porazd.ħ m=1:

$$p_k = p(1-p)^{k-1}, k = 1, 2, \ldots$$

ZVEZNE PORAZDELITVE:

OSNOVE

F(x)=Porazdelitvena funkcija

p(x)=Gostota verjetnosti

$p(x_0)$=Povprečna verjetnost

$$F(x) = \int_{-\infty}^{x} p(t)dt$$

$$p(x) = F'(x)$$

$$\int_{-\infty}^{\infty} p(x)dx = 1$$

$$P(x_1 \le X \le x_2) = F(x_2) - F(x_1$$

$$p(x_0) = \frac{P(x_1 \le X \le x_2)}{x_2 - x_1}; \quad x_1 <$$

1. ENAKOMERNA ZVEZNA PORAZDELITEV

$$p(x) = \begin{cases} \frac{1}{b-a}, & a \le x \le b, a < b \\ 0, & izven \end{cases}$$

$$F(x) = \begin{cases} 0, & x < a \\ \frac{x-a}{b-a}, & a \le x \le b \\ 1, & x > b \end{cases}$$

2. NORMALNA ALI GAUSSOVA PORAZDELITEV

$N(a, \sigma)$ a=mat. upanje σ=stand. deviacija

$D(X)=\sigma^2$

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

$$P(x_1 < X < x_2) = \Phi\left(\frac{x_2 - a}{\sigma}\right) - \Phi\left(\frac{x_1 - a}{\sigma}\right)$$

Standardizirana_norm._poraz.ħ N(

$$F(x) = \frac{1}{2} + \Phi(x)$$

$$\Phi(x) = \frac{1}{\sqrt{2\pi}} \int_0^x e^{-\frac{1}{2}t^2} \quad \ldots verjetnostni\ in$$

3. PORAZDELITEV χ^2(n)

$$p(x) = \begin{cases} \frac{1}{2^{n/2}\Gamma(n/2)} x^{\frac{n}{2}-1} e^{-\frac{x}{2}}, & x > 0 \\ 0, & x \le 0 \end{cases}$$

$n \in N$ ...št. prstih stopenj

4. PORAZDELITEV S(n)

$$p(x) = \frac{1}{\sqrt{n}B\left(\frac{n}{2}, \frac{1}{2}\right)} \left(1 + \frac{x^2}{n}\right)^{-\frac{n+1}{2}}$$

$n \in N$ ...prostostna stopnja porazdelit

5. SNEDECORJEVA PORAZDELITEV $F(m,n)$

$$p(x) = \begin{cases} C_{mn} x^{\frac{m-2}{2}} (mx+n)^{-\frac{m+n}{2}}, & x > 0 \\ 0, & x \le 0 \end{cases}$$

$m, n \in N$

6. ERLANGOVA R-FAZNA PORAZDELITEV

$$p(x) = \begin{cases} \frac{\lambda^r x^{r-1} e^{-\lambda}}{(r-1)!}, & x > 0 \\ 0, & x \le 0 \end{cases}$$

$\lambda > 0 \quad r \in N$

MATEMATIČNO UPANJE – POVPR. VREDNOST:

$$E(X) = \sum_{i=1}^{n} x_i p_i \qquad E(X^2) = \sum_{i=1}^{\infty} x_i^2$$

$$E(X) = \int_{-\infty}^{\infty} x p(x)\, dx \qquad E^2(X) = (E(X$$

DISPERZIJA – VARIANCA:

$$D(X) = E\left[(X - E(X))^2\right]$$

$$D(X) = \sum_{i=1}^{n \text{ ali } \infty} (x_i - E(X))^2 \, p_i$$

$$D(X) = \int_{-\infty}^{\infty} (x - E(X))^2 \, p(x)$$

$$D(x) = E(X^2) - E^2(X)$$

STANDARDNA DEVIACIJA:

$$\sigma_x = +\sqrt{D(X)}$$

MOMENTI SLUČ. SPREMENLJIVK:

$m_k(a)$ →moment reda k sluč. spr. X glede na a.

$$m_k(a) = E\left[(X - a)^k\right]$$

če a=0 ..imamo ZAČETNE MOMENTE

$$z_k = m_k(0) = E(X^k)$$

m_k=CENTRALNI MOMENT

$$m_k = m_k(E(X)) = E\left((x - E(X)\right)$$

E(X) = z_1

D(X) = $m_2 = \sigma^2$

$$m_n = \sum_{k=0}^{n} (-1)^{n-k} \binom{n}{k} z_1^{\,n-k} \, z_k$$

$$m_0 = z_0 = 1$$

$$m_1 = 0$$

$$m_2 = z_2 - z_1^{\,2}$$

$$m_3 = z_3 - 3z_2 z_1 + 2z_1^{\,3}$$

$$m_4 =$$

ASIMETRIJA:

$$A(X) = \frac{m_3}{\sigma^3}$$