

FORMÜLLER

Bernoulli (p): $0 \leq p \leq 1$ $P_X(x) = \begin{cases} 1-p & x=0 \\ p & x=1 \\ 0 & \text{diğer} \end{cases}$ $E[X] = p \quad Var[X] = p(1-p)$	Poisson(a): $a > 0$ $P_X(x) = \begin{cases} \frac{a^x e^{-a}}{x!} & x=0,1,2, \dots \\ 0 & \text{diğer} \end{cases}$ $E[X] = a \quad Var[X] = a$
Binomial (n,p): $0 \leq p \leq 1$ ve n pozitif tamsayı $P_X(x) = \binom{n}{x} p^x (1-p)^{n-x}$ $E[X] = np \quad Var[X] = np(1-p)$	Üssel - Exponential(λ): $\lambda > 0$ $f_X(x) = \begin{cases} \lambda e^{-\lambda x} & x \geq 0 \\ 0 & \text{diğer} \end{cases}$ $E[X] = \frac{1}{\lambda} \quad Var[X] = \frac{1}{\lambda^2}$
Discrete Uniform(k,l): k,l tamsayı ve $k < l$ $P_X(x) = \begin{cases} \frac{1}{l-k+1} & x=k, k+1, \dots, l \\ 0 & \text{diğer} \end{cases}$ $E[X] = \frac{k+l}{2} \quad Var[X] = \frac{(l-k)(l-k+1)}{12}$	Düzgün - Uniform(a,b): $a < b$ $f_X(x) = \begin{cases} \frac{1}{b-a} & a < x < b \\ 0 & \text{diğer} \end{cases}$ $E[X] = \frac{a+b}{2} \quad Var[X] = \frac{(b-a)^2}{12}$
Geometric(p): $0 \leq p \leq 1$ $P_X(x) = \begin{cases} p(1-p)^{x-1} & x=1,2, \dots \\ 0 & \text{diğer} \end{cases}$ $E[X] = \frac{1}{p} \quad Var[X] = \frac{(1-p)}{p^2}$	Erlang(n,λ): $\lambda > 0$ ve n pozitif tamsayı $f_X(x) = \begin{cases} \frac{\lambda^n x^{n-1} e^{-\lambda x}}{(n-1)!} & x \geq 0 \\ 0 & \text{diğer} \end{cases}$ $E[X] = \frac{n}{\lambda} \quad Var[X] = \frac{n}{\lambda^2}$
Pascal(k,p): $0 \leq p \leq 1$, k pozitif tamsayı $P_X(x) = \binom{x-1}{k-1} p^k (1-p)^{x-k}$ $E[X] = \frac{k}{p} \quad Var[X] = \frac{k(1-p)}{p^2}$	Gaussian(μ,σ): $\sigma > 0$ ve $-\infty < \mu < \infty$ $f_X(x) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{(x-\mu)^2}{2\sigma^2}}$ $E[X] = \mu \quad Var[X] = \sigma^2$
Bivariate Gaussian(μ_X, μ_Y, σ_X, σ_Y, ρ_{X,Y}): $\sigma_X > 0, \sigma_Y > 0, -\infty < \mu_X < \infty, -\infty < \mu_Y < \infty, -1 < \rho_{X,Y} < 1$ $f_{X,Y}(x,y) = \frac{1}{2\pi\sigma_X\sigma_Y\sqrt{1-\rho_{X,Y}^2}} e^{-\frac{\left(\frac{x-\mu_X}{\sigma_X}\right)^2 - 2\rho_{X,Y}\left(\frac{x-\mu_X}{\sigma_X}\right)\left(\frac{y-\mu_Y}{\sigma_Y}\right) + \left(\frac{y-\mu_Y}{\sigma_Y}\right)^2}{2(1-\rho_{X,Y}^2)}}$	
$\cos(A+B) = \cos(A)\cos(B) - \sin(A)\sin(B)$	$\sin(A+B) = \sin(A)\cos(B) + \cos(A)\sin(B)$
$\cos(2A) = \cos^2(A) - \sin^2(A)$	$\sin(2A) = 2\sin(A)\cos(A)$
$\sin(A)\sin(B) = \frac{1}{2}[\cos(A-B) - \cos(A+B)]$	$\cos(A)\cos(B) = \frac{1}{2}[\cos(A-B) + \cos(A+B)]$
$\sin(A)\cos(B) = \frac{1}{2}[\sin(A+B) + \sin(A-B)]$	$e^{j\theta} = \cos(\theta) + j\sin(\theta)$
$\cos(\theta) = \frac{1}{2}[e^{j\theta} + e^{-j\theta}], \sin(\theta) = \frac{1}{2j}[e^{j\theta} - e^{-j\theta}]$	$\int_a^b u dv = uv \Big _a^b - \int_a^b v du$
$\sum_{i=0}^n q^i = 1 + q + q^2 + \dots + q^n = \frac{1-q^{n+1}}{1-q}$	$\sum_{i=0}^{\infty} q^i = \frac{1}{1-q} \quad (\text{eğer } q < 1)$
$\sum_{i=1}^n i q^i = \frac{q(1-q^n[1+n(1-q)])}{(1-q)^2}$	$\sum_{i=1}^{\infty} i q^i = \frac{q}{(1-q)^2} \quad (\text{eğer } q < 1)$
$\sum_{i=1}^n i = \frac{n(n+1)}{2}$	$\sum_{i=1}^n i^2 = \frac{n(n+1)(2n+1)}{6}$
$E[g(X)] = \int_{x \in S_X} g(x) f_X(x) dx$	$E[g(X)] = \sum_{x \in S_X} g(x) P_X(x)$
$Var[X] = E[X^2] - E[X]^2$	Bağımsız $\Leftrightarrow f_{XY}(x,y) = f_X(x)f_Y(y)$ $P_{XY}(x,y) = P_X(x)P_Y(y)$
$f_X(x) = \int_{y \in S_Y} f_{XY}(x,y) dy$	$P_X(x) = \sum_{y \in S_Y} P_{XY}(x,y)$
$Q(x) = \int_x^{\infty} \frac{1}{\sqrt{2}} e^{-\frac{x^2}{2}} dx$	$\Phi(x) = 1 - Q(x)$