

DTSA 5001 - Final Exam - Formula Sheet
Common Random Variables and their Distributions

Bernoulli(p): $P\{X = 1\} = p$ and $P\{X = 0\} = 1 - p$

$$\begin{aligned}E[X] &= p \\V(X) &= p(1 - p)\end{aligned}$$

Geometric(p):

$$\begin{aligned}P(X = i) &= p(1 - p)^{i-1} \text{ for } i = 1, 2, 3, \dots \\E[X] &= \frac{1}{p} \\V(X) &= \frac{1 - p}{p^2}\end{aligned}$$

Binomial(n, p):

$$\begin{aligned}P(X = i) &= \binom{n}{i} p^i (1 - p)^{n-i} \text{ for } i = 0, 1, 2, \dots, n \\E[X] &= np \\V(X) &= np(1 - p)\end{aligned}$$

Poisson(λ):

$$\begin{aligned}P(X = i) &= \frac{e^{-\lambda} \lambda^i}{i!} \text{ for } i = 0, 1, 2, \dots \\E[X] &= \lambda \\V(X) &= \lambda\end{aligned}$$

Uniform(a, b):

$$\begin{aligned}f(x) &= \frac{1}{b - a} \text{ for } a < x < b \\E[X] &= \frac{a + b}{2} \\V(X) &= \frac{(b - a)^2}{12}\end{aligned}$$

Exponential(λ):

$$\begin{aligned}f(x) &= \frac{1}{b - a} \text{ for } 0 < x < \infty \\E[X] &= \frac{a + b}{2} \\V(X) &= \frac{(b - a)^2}{12}\end{aligned}$$

Normal(μ, σ^2):

$$\begin{aligned}f(x) &= \frac{1}{\sqrt{2\pi}\sigma} e^{-(x-\mu)^2/2\sigma^2} \text{ for } -\infty < x < \infty \\E[X] &= \mu \\V(X) &= \sigma^2\end{aligned}$$