$$pdF = \frac{1}{b-a}$$

$$E(x) = \int_a^b x\, f(x)\, dx$$

$$\int_a^b x \frac{1}{b-1}\, dx = \frac{1}{b-a}\left[\frac{x^2}{2}\right]\Big|_a^b = \frac{b^2-a^2}{2(b-a)} \quad (b-a)(+b+a)$$

$$\frac{(b+a)}{2}$$

$$V(x) = \cancel{E}(x^2) - \left(\frac{a+b}{2}\right)$$

$$E(x^2) \int_a^b x^2 f x\, dx = \frac{1}{b-a}\int_a^b (x^2\, dx)$$

$F(x) = \frac{1}{2}$ 7 solve for x

$$F(x) = P(X \leq U) = \int_a^x \frac{1}{y}\, dy\, x$$

$$a + \frac{b-a}{2} \quad \frac{a+b}{2} \quad \frac{\cancel{x} - a}{b-a} = \frac{1}{2}$$

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$$F(x) = P(X \leq x)$$

$$X \sim f(x) = \cancel{\lambda} \quad n$$

$$1 - e^{-\lambda x} = \frac{1}{2}$$

$$e^{-\lambda x} = \frac{1}{2}$$

$$X = \frac{\ln(2)}{\lambda}$$

median $X \sim f(x) P(\lambda)$

3 $X \sim N(m, \sigma^2)$

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

$$P(X \leq x)$$

$$P\left(\frac{x-\mu}{\sigma} \leq \frac{\phi - m}{\sigma}\right)$$

$$P\left(Z \leq \frac{x-\mu}{\sigma}\right) \quad \frac{x-m}{\sigma} \quad \sigma$$

$P(Z \leq Z^*) = 1/2 \rightarrow$

$Z^* = 0$

$\frac{x-\mu}{\sigma} = 0 = x = \mu$

mean of $x \sim n(\mu, \sigma^2)$

μ

$x_1, x_2, x_3 \overset{\text{inepp}}{\sim} (P(\lambda)$

$E(x_1 + 2x_2 + 3x_3)$

$E(x_1) + 2E(x_2) + 3E(x_3)$

$\lambda + 2\lambda + 3\lambda = 6\lambda$

$V = V(x_1) + 4V(x_2) + 9V(x_3)$

6) $x_1, x_2, x_n \overset{\text{ind}}{\sim} n(\mu, \sigma^2)$

estimator $\hat{\theta}$

$2\ \frac{x_1 + x_2}{2} \Rightarrow E\left(\frac{x_1 + x_2}{2}\right) = \frac{E(x_1) + E(x_2)}{2}$

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UE of $\mu = \frac{2\mu}{2} = \mu$

3 $\bar{x} \Rightarrow E\left[\frac{x_1 + x_2 + x_n}{n}\right]$

$\frac{1}{n}\left(E(x_1) + \dots + E(x_n)\right)$

$\frac{n\mu}{n} = \mu$

$\bar{X} \sim n\left(\mu, \frac{\sigma^2}{n}\right)$

$E(\bar{x})$

$MSE = Var + (bias)^2$

$= 0$

$V(x_1) = \sigma^2 \quad (x_1 \sim \sim \mu, \sigma^2)$

$V\left(\frac{x_1 + x_2}{2}\right) \frac{1}{4}\left[V(x_1) + V(x_2)\right)$

$\frac{\sigma^2}{2}$

Show that → Lodd of

me

$P(x \geq d + b) = \frac{P(x \geq d)}{P(x \geq b)}$

$X \sim Exp(\lambda)$, $P(X \geq\ )$

$P(X \geq b) = e^{-\lambda b}$

$$\frac{P(X \geq d+b)}{P(X \geq b)} = \frac{e^{-\lambda d - \lambda b}}{e^{-\lambda b}}$$

$e^{-\lambda d} = P(X \geq d)$

$\Phi = \left(\frac{a - 3\mu}{\sqrt{5}\,\hat{\sigma}} \right.$

MLE of $\hat{\mu} = \bar{x}$

$\hat{\sigma} = \sqrt{\frac{1}{n} \sum (x_i - \bar{x})^2}$

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