第六章.

7. $T \sim P(n\lambda)$

9. $T \sim N(n\mu, n\sigma^2)$

(10. 11). $X_1-2X_2+3X_3 \sim N(0,8)$.

$4X_4-3X_5 \sim N(0,9)$.

$(\sqrt{a}(X_1-2X_2+3X_3))^2+(\sqrt{b}(4X_4-3X_5))^2 \sim \chi^2(2)$

$\sqrt{a}=\frac{1}{\sqrt{8}}$ $\therefore a=\frac{1}{8}$ $b=\frac{1}{9}$ $n=2$

(2)
$$\frac{\sqrt{3}c\left(\frac{X_1+X_2+X_3}{\sqrt{3}}\right)}{\sqrt{2}\sqrt{\frac{X_4^2+X_5^2}{2}}}$$ $n=2$. $X_4^2+X_5^2 \sim \chi^2(2)$

$$\frac{X_1+X_2+X_3}{\sqrt{3}} \sim N(0,1).$$

$\therefore \frac{\sqrt{3}}{\sqrt{2}}c=1$ $\therefore c=\sqrt{\frac{2}{3}}=\frac{\sqrt{6}}{3}$ $n=2$

(3). $$\frac{3d}{2}\frac{\frac{X_1^2+X_2^2+X_3^2}{3}}{\frac{X_4^2+X_5^2}{2}}$$ $\therefore \frac{3}{2}d=1$ $\therefore d=\frac{2}{3}$

自由度(3, 2)

11. $S_w^2 = \frac{(m-1)S_1^2+(n-1)S_2^2}{m+n-2} = \frac{8S_1^2+8S_2^2}{15}$.

$m=8 \quad n=9$

$T = \frac{\bar{X}-\bar{Y}-(\mu_1-\mu_2)}{S_w\sqrt{\frac{1}{8}+\frac{1}{9}}} \sim t(m+n-2) \sim t(15)$

18. $f_1(x) = F_1'(x) = \binom{n}{1} F^0(x)(1-F(x))^{n-1} f(x)$

$= \begin{cases} \frac{n(b-x)^{n-1}}{(b-a)^n}, & a<x<b \\ 0, & 其他 \end{cases}$

19. (1) $0.1587 \quad 0.3413$

(2) $(0.1587)^9 \quad (0.8413)^9$

[illegible]

第七章

1.(1) $\mu_1 = \overline{X} = \int_0^1 x(\theta+1)x^{\theta}\,dx$ $\qquad \theta = \frac{2\overline{X}-1}{1-\overline{X}}$

似然函数 $L(\theta) = \prod_{i=1}^{n}(\theta+1)x_i^{\theta} = (\theta+1)^n \left(\prod_{i=1}^{n} x_i\right)^{\theta}$

$$\ln L(\theta) = n\ln(\theta+1) + \theta\sum_{i=1}^{n}\ln x_i$$

$$\frac{d(\ln L(\theta))}{d\theta} = \frac{n}{\theta+1} + \sum_{i=1}^{n}\ln x_i = 0$$

$$\hat{\theta} = -\frac{n}{\sum_{i=1}^{n}\ln x_i} - 1$$

(2.) 矩估计 $\hat{\mu} = \frac{1}{n}\sum_{i=1}^{n}\ln x_i$

$$\hat{\sigma}^2 = \frac{1}{n}\sum_{i=1}^{n}\left(\ln x_i - \frac{1}{n}\sum_{i=1}^{n}\ln x_i\right)^2$$

最大似然估计. $\hat{\mu} = \frac{1}{n}\sum_{i=1}^{n}\ln x_i$

$$\hat{\sigma}^2 = \frac{1}{n}\sum_{i=1}^{n}\left(\ln x_i - \frac{1}{n}\sum_{i=1}^{n}\ln x_i\right)^2$$

(3) 矩估计. $\hat{\lambda} = \frac{1}{\overline{X}}$

最大似然估计 $\hat{\lambda} = \frac{1}{\overline{X}}$

(4) 矩估计 $\hat{\mu} = \overline{X} - \sqrt{\frac{1}{n}\sum_{i=1}^{n}(X_i-\overline{X})^2}$

$$\lambda = \frac{1}{\sqrt{\frac{1}{n}\sum_{i=1}^{n}(X_i-\overline{X})^2}}$$

最大似然估计 $\hat{\mu} = \min(X_1 \cdots X_n)$

$$\hat{\lambda} = \frac{1}{\overline{X} - \min(X_1 \cdots)}$$

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[illegible]

(5). 矩估计. $\hat{\theta}=\overline{X}$.

最大似然 $[X_{(n)}-0.5, X_{(1)}+0.5]$ 随意.

2. $\hat{\mu}=\overline{X}$

$\hat{\sigma}=\sqrt{\frac{1}{n}\sum_{i=1}^{n}(X_i-\overline{X})^2}$

5. 矩法 $\hat{\theta}=1.25$.

极大似然 $\hat{\theta}=1.75$