

- 9. 解:
- (1)

由题意知,

$$rac{(n-1)S^2}{\sigma^2} \sim \chi^2(n-1)$$

故,

$$P(rac{S^2}{\sigma^2} \leq 2.041) = P(rac{\chi^2(n-1)}{n-1} \leq 2.041) = 1 - P(\chi^2(15) \geq 30.615) \approx 0.99$$

(2)

由(1)知,

$$D(\frac{(n-1)S^2}{\sigma^2}) = D(\chi^2(n-1)) = 2(n-1) = 30$$

故,

$$D(S^2) = (\frac{\sigma^2}{n-1})^2 D(\frac{(n-1)S^2}{\sigma^2}) = \frac{2\sigma^4}{15}$$

- 2. 解:
- (2)

$$\mu_1 = E(X) = \int_0^1 x f(x) \mathrm{d}x = \int_0^1 \sqrt{ heta} x^{\sqrt{ heta}} \mathrm{d}x = rac{\sqrt{ heta}}{\sqrt{ heta} - 1} = \overline{X}$$

解得矩估计量

$$\hat{ heta} = rac{\overline{X}^2}{(\overline{X} - 1)^2}$$