

# 作业纸

课程名称: 概率论

班级: 63012216 教学班级: 08012204 姓名: 俞乐楠 学号: 1120221323 第 1 页

10. 11).  ~~$f(x)$~~   $f(x) = F(x) = \begin{cases} \frac{1}{2}e^x & x < 0 \\ 0 & 0 \leq x \leq 1 \\ \text{其他} & e^{-\frac{x-1}{2}} \end{cases}$

$$E(x) = \int_{-\infty}^{+\infty} x f(x) dx = 1$$

12).  ~~$E(x)$~~   $E(x^2)$

$$D(x) = E(x^2) - (E(x))^2 = \frac{11}{2}$$

13.  ~~$E(x)$~~   $E(x) = \frac{2}{3}$

$x$	1	0
$P$	$\frac{1}{3}$	$\frac{2}{3}$

$$E(x) = \frac{1}{3}$$

$$D(x) = \sum (x_i - E(x))^2 P(x_i) = \frac{8}{9}$$

14. 11)  ~~$E(x)$~~   $E(x) = \frac{1}{\sqrt{2}}$

$$\sigma = \frac{1}{\sqrt{2}}, \mu = 0, E(y) = \mu = 0$$

12)  $D(y) = \sigma^2 = \frac{1}{2}$

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$$7. f(x) = 0.3N(0, 1) + 0.7N(1, 4)$$

$$1) E(x) = 0.7$$

$$2) D(x) = \cancel{0.3^2 + 4(0.7)^2 + 2 \cdot 0.3 \cdot 0.7 \cdot 2}$$

$$= D(0.3N(0, 1)) + D(0.7N(1, 4))$$

$$+ 2E(0.3N(0, 1) \cdot 0.7N(1, 4))$$

$$= (0.3)^2 + 4(0.7)^2 + 2E(0.21N(0, 1) - 0.3N(0, 1))$$

$$= 0.09 + 1.96 + \cancel{0.42 \times 0.21 \times 2} = 2.05$$

$$20. Y = X.$$

$$1) \therefore E(Y) = E(X) = \int_{-\infty}^{+\infty} x f(x) dx = \frac{1}{\pi} \ln 2 + \frac{1}{\pi}$$

$$2) D(Y) = D(X) = \frac{1}{\pi} (2 - \ln 2) - \left( \frac{1}{\pi} \ln 2 + \frac{1}{\pi} \right)^2 = \frac{1}{\pi}$$

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24. 1)  $E(U) = \frac{n}{n+1}$   $E(V) = \frac{n}{n+1}$

2)  $E(U) = \frac{n}{(n+1)(n+1)^2}$

3)  $P(V) = \frac{n}{(n+1)(n+1)^2}$

34.  $E(X) = 20$   $E(Y) = 20$

$$Y = \begin{cases} 50X - 10Z & Z \geq X \\ 50X + 30Z & Z < X \end{cases}$$

$E(Y) = 20 \therefore Z = 2$

35.  $P(1) = \frac{2(n-6^2-n^2)}{n(n+1)}$

36. 1)  $E(X) = \frac{1}{2}$

2)  $\alpha = \frac{1}{2}$   
 $\beta = \frac{1}{4}$

3) 不独立

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$$\rho_{xy} = \frac{\text{cov}(X, Y)}{\sqrt{D(X) D(Y)}} = \frac{\sqrt{2}}{2}$$

$$42. \rho_{xy} = \frac{\text{cov}(X, Y)}{\sqrt{D(X) D(Y)}} = \frac{\sqrt{5}}{4}$$

$$44. \rho_{xz} = \frac{\text{cov}(X, Z)}{\sqrt{D(X) D(Z)}}$$

$$\text{cov}(X, Z) = \text{cov}(X, X + 3Y)$$

$$= 9$$

$$\therefore \rho_{xz} = \frac{3}{\sqrt{17}}$$

$$45. D(X - Y) = 4$$

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