

## 作业纸

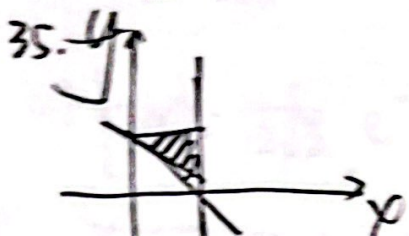
课程名称: 概率论

学号: 11204433

姓名: 俞立峰

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19-34. 已做前题上题.



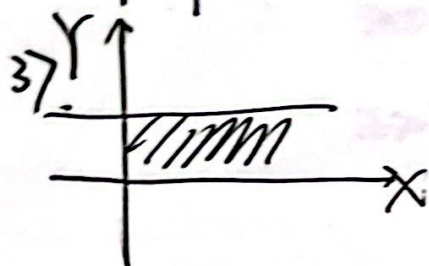
$$f_z(z) = \int_{-\infty}^{\infty} f(x, z) dx$$

$$-1 < z < 1 \Rightarrow \begin{cases} z > x \\ x < 1 \end{cases}$$

$$0 < z < 1 \Rightarrow \begin{cases} z > x \\ z < 1+x \end{cases}$$

$$f_z(z) = \int_1^{z+1} 3x dx = 3x - \frac{3}{2}x^2, \quad 1 < z < 2$$

$$\begin{cases} 0 & \text{其他} \end{cases}$$



$$f(x, y) = \begin{cases} e^{-x} & (x > 0, y < 1) \\ 0 & \text{其他} \end{cases}$$

$$z = x + y, \quad y = z - x \quad 0 < z - x < 1 \Rightarrow \begin{cases} z > x \\ z < x + 1 \end{cases}$$

$$f_z(z) = \int_0^z 2(z-x)e^{-x} dx = 2(z + e^{-z} - 1), \quad 0 < z < 1$$

$$2e^{-z}, \quad z > 1$$

$$0, \quad \text{其他}$$

联系方式: \_\_\_\_\_

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教学班级: \_\_\_\_\_

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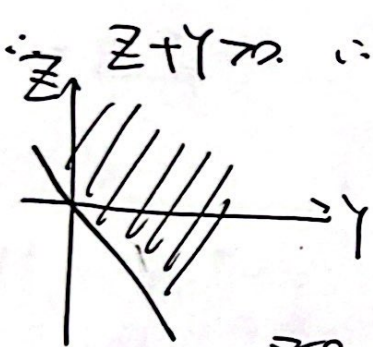
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39. (1)  $f_1(x) = \frac{1}{2\sqrt{\pi}} e^{-\frac{(x-1)^2}{4}}$

(2)  $f_2(x) = \frac{1}{2\sqrt{\pi}} e^{-\frac{(x+1)^2}{4}}$

41.  ~~$Y = X + Z$~~   $X = Z + Y, Y > 0$



$Z > -Y$

$f(Z+Y, Y) = \begin{cases} e^{-(Z+2Y)}, & Y > 0, Z > -Y \\ 0, & \text{其他} \end{cases}$

~~$Z < 0$~~

$Z < 0, f_Z(Z) = \int_{-Z}^{+\infty} e^{-(Z+2Y)} dY = \frac{1}{2} e^{-Z}$

$Z > 0, f_Z(Z) = \int_0^{+\infty} e^{-(Z+2Y)} dY = \frac{1}{2} e^{-Z}$

$\therefore f_Z(Z) = \frac{1}{2} e^{-Z}$

45. (1). 不独立

(2).  $f_M(z) = \begin{cases} 3z^2, & 0 < z < 1 \\ 0, & \text{其他} \end{cases}$

46.  $f_Z(z) = \begin{cases} 1, & 0 < z < 1 \\ 0, & \text{其他} \end{cases}$

联系方式: \_\_\_\_\_



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解 2.  $E = \frac{4}{5} \times 2 \times 3 + \frac{1}{5} \times 5 \times 3 = \frac{29}{5} = 5.8$

8. (1)  $\int_0^2 Ax + \frac{1}{3} dx$   $\because A = \frac{1}{6}$

(2)  $E(X) = \int_0^2 x(Ax + \frac{1}{3}) dx = \int_0^2 x(\frac{1}{6}x + \frac{1}{3}) dx = \frac{10}{9}$

11. (1)  $\int_0^1 (ax^4 + b) dx = 1$

$\int_0^1 x(ax^4 + b) dx = \frac{1}{2}$

$\Rightarrow \begin{cases} a = 1 \\ b = \frac{2}{3} \end{cases}$

(2)  $P\{-1 < X < 1\} = \int_0^{\frac{1}{2}} (x^2 + \frac{2}{3}) dx = \left(\frac{x^3}{3} + \frac{2}{3}x\right)\bigg|_0^{\frac{1}{2}} = \frac{1}{24} + \frac{1}{3} = \frac{5}{24}$

18.  $E(Z) = \int_0^3 \frac{1}{81} x^6 dx = \int_0^3 \frac{16}{81} x dx$   
 $= \frac{2}{81} x^2 \bigg|_0^3 = \frac{2}{81} \cdot 9 = \frac{2}{9}$

联系方式: \_\_\_\_\_



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21.  ~~$E(X) = 1/2$~~

~~$E(Y) = 0$~~

~~$\therefore E(XY) = 2E(X^2Y) + 1 = E(1) = 1$~~

$E(X) = 1/2$

$E(Y) = 0$

$E(Y) = \int_{-\infty}^{+\infty} (y^2 + y) dy = -y^2 e^{-y} \Big|_0^{+\infty} + \int_0^{+\infty} e^{-y} dy$   
 ~~$= -\int_0^{+\infty} y dy = -\infty$~~   $= 2$

$\therefore E(XY^2) = 2E(X^2Y) + 1 = 8 + 1 = 9$

26.

(1)

X	1	2	3
P	0.4	0.2	0.4

$E(X) = 2$

Y	1	2	3
P	0.3	0.4	0.3

$E(Y) = 2$

(2).  $E(Z) = E((X-Y)^2) = 5$

联系方式: \_\_\_\_\_