

8-p սաղմօն

8.2

a) (x, y) վեկտօր չփականում քանիւն լիքայնաւ առ.

$x \quad 0 \quad 1 \quad 2 \quad 3$

$0 \quad 0 \quad 1/70 \quad 3/70 \quad 1/70$

$1 \quad 2/105 \quad 6/135 \quad 6/35 \quad 2/105$

$2 \quad 9/35 \quad 9/35 \quad 3/35 \quad 0$

$3 \quad 4/35 \quad 2/35 \quad 0 \quad 0$

$4 \quad 1/210 \quad 0 \quad 0 \quad 0$

b) $x \quad 0 \quad 1 \quad 2 \quad 3 \quad \Sigma$

$0 \quad 0 \quad 1/70 \quad 3/70 \quad 1/70 \quad 4/14$

$1 \quad 3/105 \quad 6/135 \quad 6/35 \quad 2/105 \quad 8/21$

$2 \quad 9/35 \quad 9/35 \quad 3/35 \quad 0 \quad 3/7$

$3 \quad 4/35 \quad 2/35 \quad 0 \quad 0 \quad 4/35$

$4 \quad 1/210 \quad 0 \quad 0 \quad 0 \quad 1/210$

$\Sigma \quad 1/6 \quad 1/2 \quad 3/10 \quad 1/30 \quad 1 \quad 18/18$

c) $P(x=1 | y=0) = P(x=2 | y=0) = \frac{3/35 + 1/6}{35} = \frac{18}{35}$

d) $P(y=2) = 3/10$

e) $P\{x=2, y=2\} = P\{x=2, y=0\} + P\{x=2, y=1\} = \frac{3}{35} + \frac{9}{35} + \frac{3}{35} = \frac{3}{7}$

$P\{x=3, y=2\} = 4/35 \quad P\{x=4, y=2\} = 1/210 \quad P\{x>2, y>2\} = \frac{115}{210} - \frac{28}{210}$

8.4 а) Стансардний боловий ходжан тұрған.

$$P(X_1, X_2) = P(X_1)P(X_2)$$

негдеумм жаһама.

Чынаас $P(X_1=0, X_2=0) = P(X_1=0, X_2=0, X_3=0) +$

$$P(X_1=0, X_2=0, X_3=1)$$

$$\Rightarrow 0.192 + 0.144 = 0.336$$

$$P(X_1=0) \Rightarrow \sum_{i=0}^1 P(X_1=0, X_2=i, X_3=j)$$

$$= 0.192 + 0.144 + 0.192 + 0.064 = 0.592$$

Чынаас үндөл $P(X_1=0, X_2=0) = 0.336 \neq 0.355 = P(X_1=0)$

$P(X_1=0, X_2=0 | X_3=0)$ 2 жұғасындаң мәндердің жиынтығын салына.

б. Жамнишын жөнен X_3 -нің таралығын озға

$$P(X_1=0, X_2=0 | X_3=0) = \frac{P(X_1=0, X_2=0, X_3=0)}{P(X_3=0)} = \frac{0.192}{0.48}$$

$$\Rightarrow 0.4$$

$$P(X_1=0, X_2=1 | X_3=0) = 0.1 \quad \text{жәк жағы}$$

Бүгінша оғызу

X_1	X_2	$X_3=0$	$\delta_{0,1}$
0	0	0.4	0.4
0	1	0.1	0.1
1	0	0.4	0.4
1	1	0.1	0.1

Жаһамынан нәе 0.1861

$$P(X_1=0 | X_3=0) = P(X_1=0, X_2=0, X_3=0) + P(X_1=0, X_2=1 | X_3=0)$$

$$= 0.4 + 0.1 = 0.5$$

x_1	$P(x_1=1 x_3=0)$	x_2	$P(x_2=1 x_3=0)$
0	0.5	0	0.8
1	0.5	1	0.2

�្មោះ

$$P(x_1=0, x_2=0 | x_3=0) = 0.4 = P(x_1=0 | x_3=0) P(x_2=0 | x_3=0)$$

$$P(x_1=0, x_2=1 | x_3=0) = 0.1 = P(x_1=0 | x_3=0) P(x_2=1 | x_3=0)$$

$$P(x_1=1, x_2=0 | x_3=0) = 0.4 = P(x_1=1 | x_3=0) P(x_2=0 | x_3=0)$$

$$P(x_1=1, x_2=1 | x_3=0) = 0.1 = P(x_1=1 | x_3=0) P(x_2=1 | x_3=0)$$

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8.6. 2. $X \rightarrow Z \leftarrow Y$ ឯកសារ ឯកសារ ឯកសារ

8.7 (a) $X \rightarrow U \leftarrow Y \rightarrow Z$

(b) $(W \amalg Z) \perp Y$

$$f_{x,y}(x,y) = \begin{cases} 3x^2/16 + y/12, & 0 < x < 2, 0 < y < 1 \\ 0, & \text{ស្ថា} \end{cases}$$

$$\int y f_{x,y}(y) dy = \int_0^1 \left(\frac{3x^2}{16} + \frac{y}{2} \right) dy = \left(\frac{x^3}{16} + \frac{y^2}{2} \right) \Big|_0^1$$

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$$= \frac{2y+1}{2} = y + \frac{1}{2}$$

$$f_y(y) = \begin{cases} y + 1/2, & 0 < y < 1 \\ 0, & \text{ស្ថា} \end{cases}$$

$$\int x f_{x,y}(x,y) dx = \frac{\int x y (x,y) dx}{\int y f_{x,y}(x,y) dx} = \frac{3x^2 + 8y}{8(1+y)}$$

$$\text{ដែល } f_{x,y}(x,y) = \frac{f_{x,y}(x,y)}{f_y(y)} = \frac{3x^2 + 8y}{8(1+y)}, \quad 0 < x < 2, \quad 0 < y < 1$$

$$E(X|Y) = \int_{-\infty}^{+\infty} xf_{X|Y}(x|y)dx = \int_0^2 x \frac{3x^2 + 8y}{8(1+2y)} dx = 1 + \frac{1}{2+4y} \quad 0 < y < 1$$

Daxmu matematik gyzgash abdai

$$E(E(X|Y)) = \int_0^1 \frac{3+4y}{2+4y} \left(\frac{1}{2} + y \right) dy = \frac{5}{4}$$

$E(X)$ -min gyzgash mi

$$f_X(x) = \int_0^1 \left(\frac{3x^2}{16} + \frac{y}{2} \right) dy = \frac{3x^2}{16} + \frac{1}{4}$$

$$E(X) = \int_0^2 x \left(\frac{3x^2}{16} + \frac{1}{4} \right) dx = \frac{5}{4}$$

Егерде $E(E(X|Y)) = \frac{5}{4}$ $E(X) = \frac{5}{4}$ zapshapka

Tenges dolox no esidargash daima.

Homework

8.1

a) $P(x=0, y=-1) + (x=0, y=0) + (x=0, y=1)$

$$\Rightarrow 0.1 + 0.240 = 0.3$$

$$P(x=-1) = 0.7$$

x	-1	0	1
y	0.1	0.2	0.0
$f(x)$	1	0.2	0.3
	0.7	0.3	0.0

b) $f_{X,Y}(x,y) = f_X(x) \cdot f_Y(y)$

$$f_{X,Y}(0, -1) = 0.1 \neq f_X(0) \cdot f_Y(-1) = 0.3 \cdot 0.3 = 0.09$$

Therefore \rightarrow X and Y are not independent

c) $P(y|x=1) = \frac{P(x=1, y)}{P(x=1)} = \begin{cases} 2/7 & y=1 \\ 3/7 & y=0 \\ 2/7 & y=-1 \end{cases}$

$$y \quad | \quad -1 \quad 0 \quad 1$$

$$f_{Y|X}(y|x=1) \quad | \quad 2/7 \quad 3/7 \quad 2/7$$

$$8.3 \quad P(x+y \leq 1) = \int_0^1 \int_0^{1-x} \left(3x^2 + \frac{y}{2} \right) dy dx$$

$$= \int_0^1 \left(\frac{3x^2}{2} y + \frac{y^2}{4} \right) \Big|_0^{1-x} dx = \frac{1}{16} \int_0^1 (-3x^3 - 8x^2 + 4 + 7x^2) dx$$

$$= \frac{1}{16} \left(-\frac{3}{4}x^4 - 4x^3 + 4x + \frac{7}{3}x^3 \right) \Big|_0^1 = \frac{19}{192} = 0.098$$

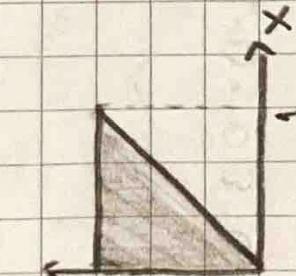
$$8.5. \quad \frac{f_{x,y_1,2}(x,y_1,2)}{f_{y_1,2}(y_1,2)} = f_{x,12}(x,12)$$

$$\Rightarrow f_{x,y_1,2}(x,y_1,2) = f_{y_1,2}(y_1,2) f_{x,12}(x,12)$$

$$\Rightarrow \frac{f_{x,y_1,2}(x,y_1,2)}{f_{y_1,2}(y_1,2)} = f_{x,12}(x,12) \frac{f_{y_1,2}(y_1,2)}{f_{x,12}(x,12)}$$

$$\Rightarrow f_{x,y_1,2}(x,y_1,2) = f_{x,12}(x,12) f_{y_1,2}(y_1,2)$$

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$$b) \quad f_x(x) = \int_x^1 2 dy = 2(1-x) \quad 0 < x < 1$$

$$f_x(x) = \begin{cases} 2(1-x) & 0 < x < 1 \\ 0 & \text{else} \end{cases}$$

Beispiel

$$c) \quad \mathbb{E}(Y|X=x) = \frac{\int x y f_{x,y}(x,y)}{\int x f_{x,y}(x,y)} = \frac{x}{1-x} \quad X \leq y \leq 1$$

$$d) \quad \mathbb{E}(Y|X=x) = \int_y^1 y f_{y|x}(y|x) dy$$

$$\Rightarrow \int_y^1 y \frac{1}{1-x} dy = \frac{1}{1-x} \int_y^1 y dy = \frac{1}{1-x} \cdot \frac{y^2}{2} \Big|_y^1 = \frac{1-y^2}{2}$$