11.01.

СЕМ упр.

1зад X - температура

Y - време

$$f_{X,Y}(x,y) = \frac{1}{2000}(x + 5y + 10)$$

$$x \in [-10; 80]$$

$$y \in [0; 2]$$

$$\int_{150}^{202}\int f_{X,Y}(x,y)\,dx\,dy = 1$$

а) $Y > 1$

$$P(Y > 1) = \int_{-10}^{80}\int_{1}^{2} \frac{1}{2000}(x + 5y + 10)\,dy\,dx$$

б) $$P(A|B) = \frac{P(A \cap B)}{P(B)}$$

$$f_{X,Y}(x,y) \approx P(X = x, Y = y)$$

$$f_{Y|X}(y|x = 15) = \frac{f_{X,Y}(15,y)}{f_X(15)}$$

$$f_{X,Y}(15,y) = \frac{1}{2000}(15 + 5y + 10)$$

$$f_X(2) = \int_{-\infty}^{\infty} f_{X,Y}(2,y)\,dy =$$

$$= \int_0^2 \frac{1}{2000}(2 + 5y + 10)\,dy$$

Намираме $f_X(15) \Rightarrow$ и условната плътност

$$f_{Y|X}(y|x = 15)$$

$$E(Y|X = 15) = \int_0^2 y \cdot f_{Y|X}(y|x = 15)\,dy$$

в) Ако $T = 1,5$ колко е вер $t° < 0$

$$P(X < 0 \,|\, Y = 1,5) = ?$$

$$f_{X|Y}(x|y = 1,5) = \frac{f_{X,Y}(x; 1,5)}{f_Y(1,5)}$$

$$f_X(1,5) = \int_{-10}^{80} f_{X,Y}(x; 1,5)\,dx$$

$$P(X < 0 \,|\, y = 1,5) = \int_{-10}^{0} f_{X,Y}(x|y = 1,5)\,dx$$