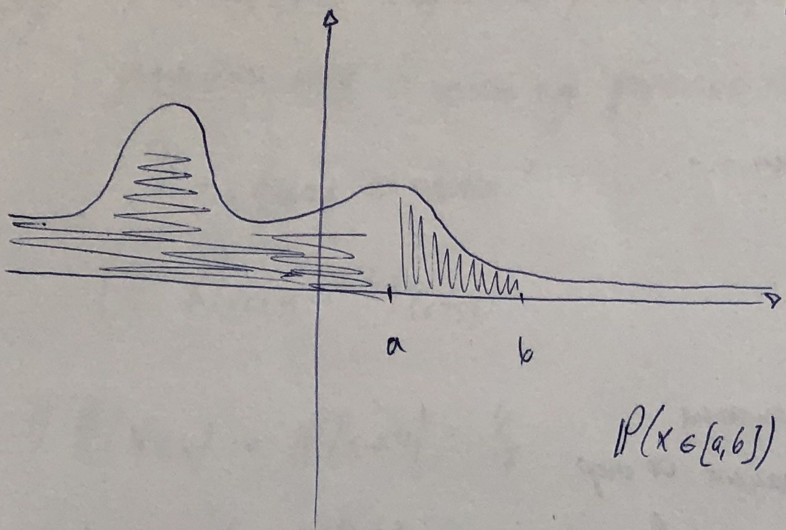


$$EX = \int_{-\infty}^{\infty} x f_X(x)\,dx$$

$$Eg(X) = \int_{-\infty}^{\infty} g(x) \cdot f_X(x)\,dx \Rightarrow$$

$$\Rightarrow EX^2 = \int_{-\infty}^{\infty} x^2 f_X(x)\,dx \cdot f_X(x)$$

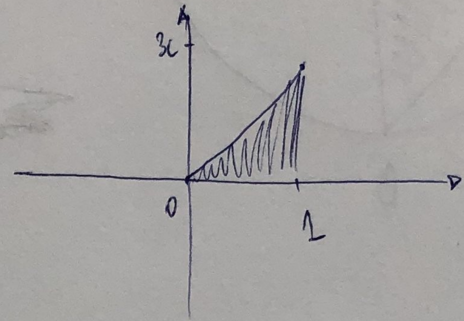
$$\mathbb{P}(X \in [a,b]) = \int_a^b f_X(x)\,dx = F_X(b) - F_X(a)$$

Зад. число

$$f_{X}(x) = \begin{cases} c(x^2+2x) & x \in [0,1] \\ 0 & x \notin [0,1] \end{cases}$$

делени сл. вел. X

$$f_X(y) = \begin{cases} c(y^2+2y) & y \in [0,1] \\ 0 & y \notin [0,1] \end{cases}$$



а) $\int_{-\infty}^{\infty} f_X(x)\,dx = 1$

$\int_0^1 c(x^2+2x)\,dx = 1$

$c\left(\frac{x^3}{3} + 2\frac{x^2}{2}\right)\Big|_0^1 = c\left(\frac{4}{3}\right) = 1$

след. $c = 3/4$

б) EX и $DX = ?$

$EX = \int_{-\infty}^{\infty} x f_X(x)\,dx = \int_0^1 x\, \frac{3}{4}(x^2+2x)\,dx =$

$= \frac{3}{4}\left(\frac{x^4}{4} + 2\frac{x^3}{3}\right)\Big|_0^1 = \frac{3}{4}\left(\frac{1}{4} + \frac{2}{3}\right) = \frac{11}{16}$

$DX = EX^2 - (EX)^2$

$EX^2 = \int_{-\infty}^{\infty} x^2 f_X(x)\,dx = \int_0^1 x^2 \cdot \frac{3}{4} \cdot (x^2+2x)\,dx$

$DX = EX^2 - (EX)^2$ и заместване

в) $\mathbb{P}(X \le EX) = \mathbb{P}\left(X \le \frac{11}{16}\right)$

$= \int_0^{11/16} \frac{3}{4}(x^2+2x)\,dx =$ нещо

* $\mathbb{P}(X \le a) = \underset{cdf}{F_X}(a)$! f - pdf

Каква е функ. на X?

$$F_X(x) = \begin{cases} 0 & \text{, ако } x<0 \\ \int_0^x \frac{3}{4}(y^2+2y)\,dy & \text{, ако } x \in [0,1] \\ 1 & \text{, ако } x>1 \end{cases}$$