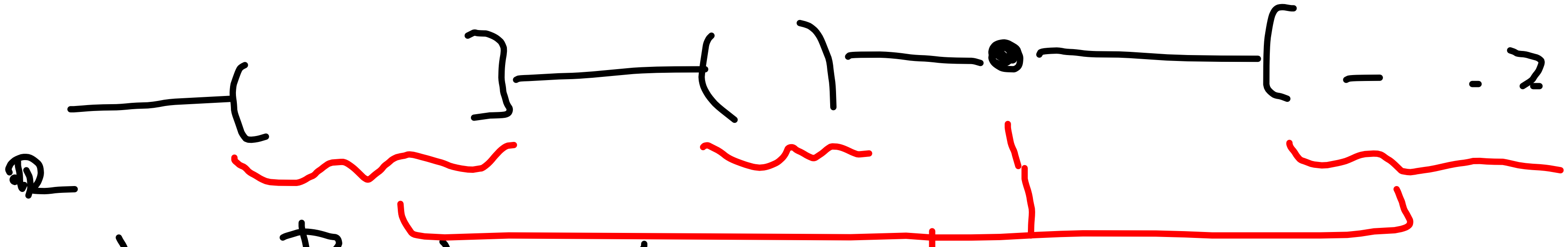
Náhodná veličina

$$X : \Omega \to \mathbb{R}$$



Jaká P, že $X \in$?

$$P[a < X \leq b]$$

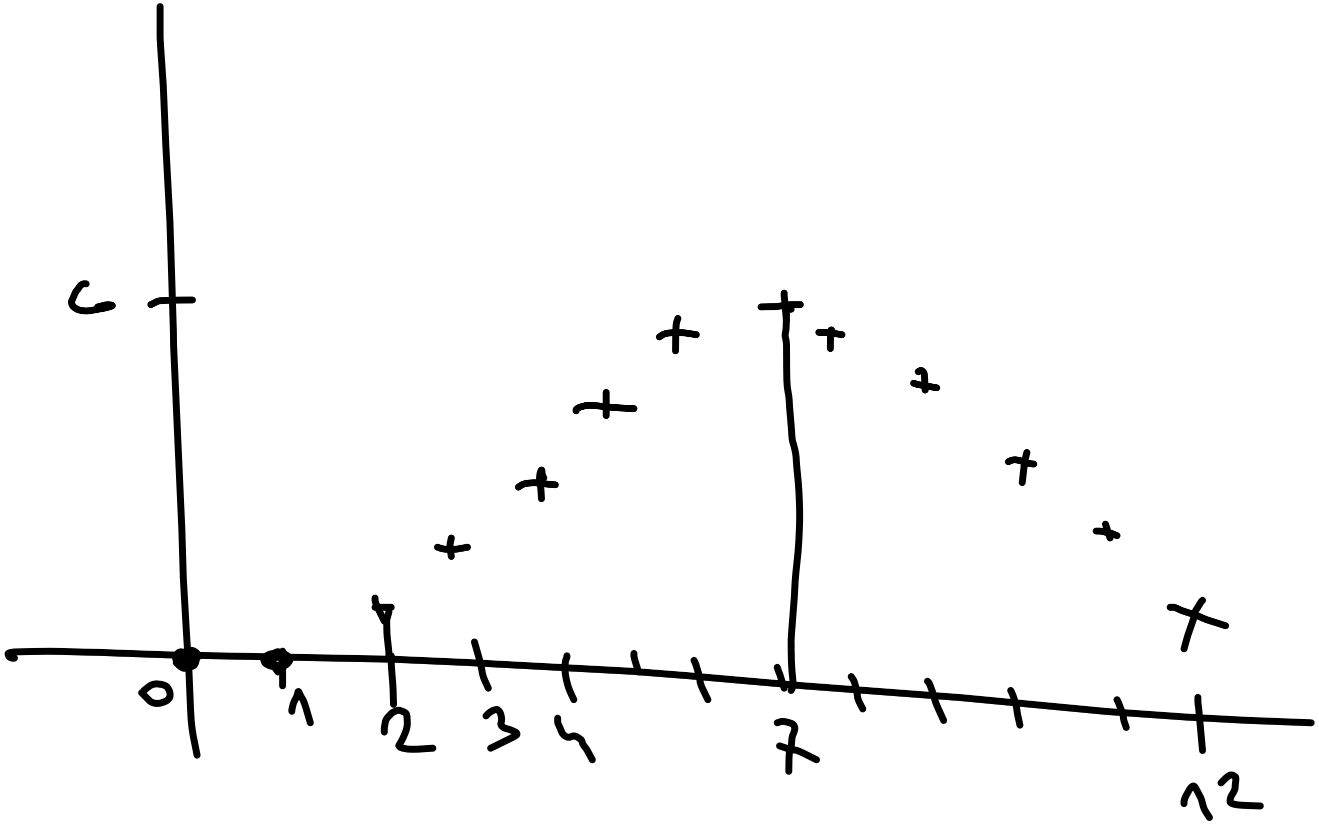
$$A = \{\omega \in \Omega ; a < X(\omega) \leq b\}$$

Distr. fce

$$F_X(x) = P(X \leq x)$$

$$\lim_{x \to \infty} F_X(x) = 1$$

Součet na 2 kostkách



$$P[x < X \leq x + dx] = \underbrace{f(x)}_{\text{hustota}}\, dx$$

$$P(a < X \leq b) = \int_a^b f(x)\, dx$$

$$= F_X(b) - F_X(a)$$

$$F_X'(x) = f(x)$$

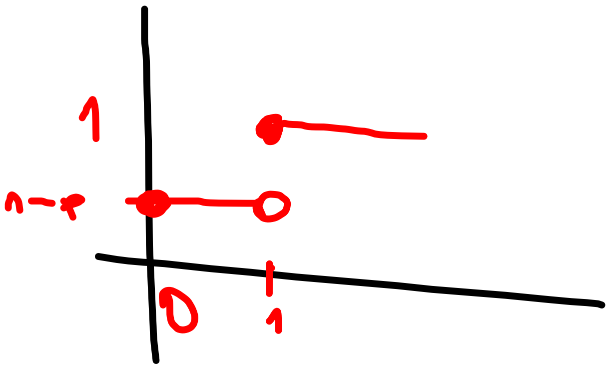
diskrétní X:

$$F_X(x) = \sum_{x_i \leq x} p(x_i)$$

$1 \;\ldots\ldots\; p$

$0 \;\ldots\ldots\; 1-p$

$X \sim A(p)$



$X \sim Bi(n,p)$

$f_X(t) = \qquad t \in \{0, \ldots, n\}$

$= \binom{n}{t} p^t \cdot (1-p)^{n-t}$

$$\lim_{n\to\infty} \frac{r_n}{n} = \lambda$$

$$\lim_{n\to\infty} \left(1+\frac{1}{n}\right)^n = e \qquad e^x = \lim_{n\to\infty} \left(1+\frac{x}{n}\right)^n$$

$$e = \sum_{n=0}^{\infty} \frac{1}{n!}$$

$Rs(a,b)$

chceme $f_X(t) = \text{konst.}$ pro $a \leq x \leq b$

$$\lim_{t\to\infty} F_X(t) = 1$$

$$\lim_{t\to\infty} P[X \leq t] = \lim_{t\to\infty} \int_{-\infty}^{t} f_X(t)\,dt =$$

$$= \int_{-\infty}^{\infty} f_X(t)\,dt = 1$$

$$F_X(t) = \int_{-\infty}^{t} f_X(t)\,dt = \int_{-\infty}^{a} 0\,dt + \int_{a}^{b} \frac{1}{b-a}\,dt + \int_{b}^{\infty} 0\,dt$$

$$P(t+s) = P(t)\cdot P(s) \qquad P(0) = 1!$$

$$\ln P(t+s) = \ln P(t) + \ln P(s)$$

$$\lim_{s\to 0} \frac{\overbrace{\ln P(t+s) - \ln P(t)}^{\ln P(s)}}{s} = (\ln P)'(0)$$

$$\ln P(t) = -\lambda t + c$$

$$0 = \ln P(0) = -\lambda\cdot 0 + c \Rightarrow c = 0$$

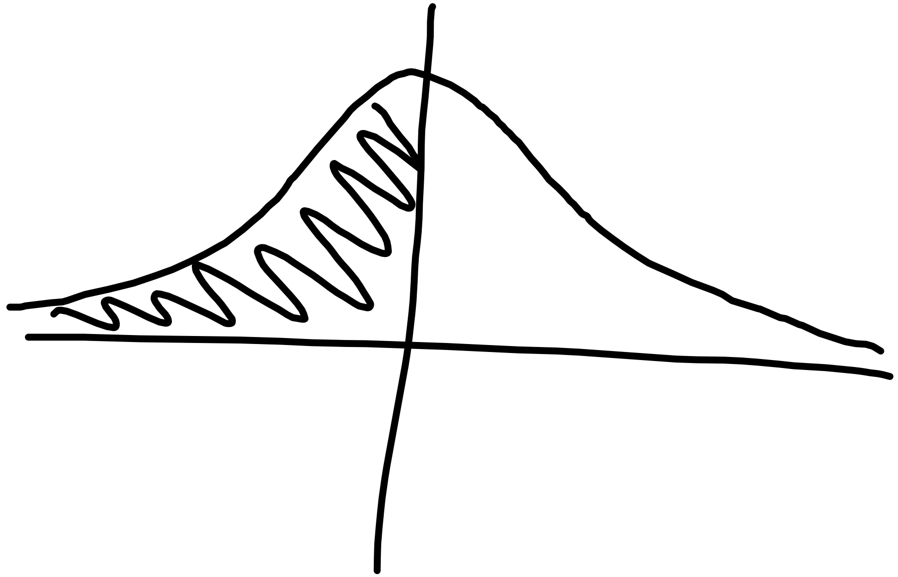
$$\underline{P(t) = e^{-\lambda\cdot t}}$$

$$\int_{-\infty}^{\infty} e^{-\frac{x^2}{2}}\,dx = \sqrt{2\pi}$$

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

$$F_X(t) = \int_{-\infty}^{t} \frac{1}{\sqrt{2\pi}} e^{-\frac{x^2}{2}}\,dt$$

$$f_X(t) = \frac{1}{\sqrt{2\pi}} \cdot e^{-\frac{t^2}{2}}$$



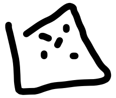
$$P(X \le t) = \frac{t}{r}$$

$$t \in \langle 0, r \rangle$$

$$x \in \{x_1, \dots, x_n\}$$

$$\psi(x) \in \{a + b x_1, \dots, a + b x_n\}$$

$$f_{\psi(X)}(y) = P(\psi(X) = y) = \sum_{\psi(x_i) = y} f(x_i)$$

hody kostkou 2:  $+1$

$$f_{Y(X)}(1) = 0 \qquad f_{Y(X)}(13) = \frac{1}{6}$$

$$f_X(1) = \frac{1}{6} \qquad f_X(13) = 0$$