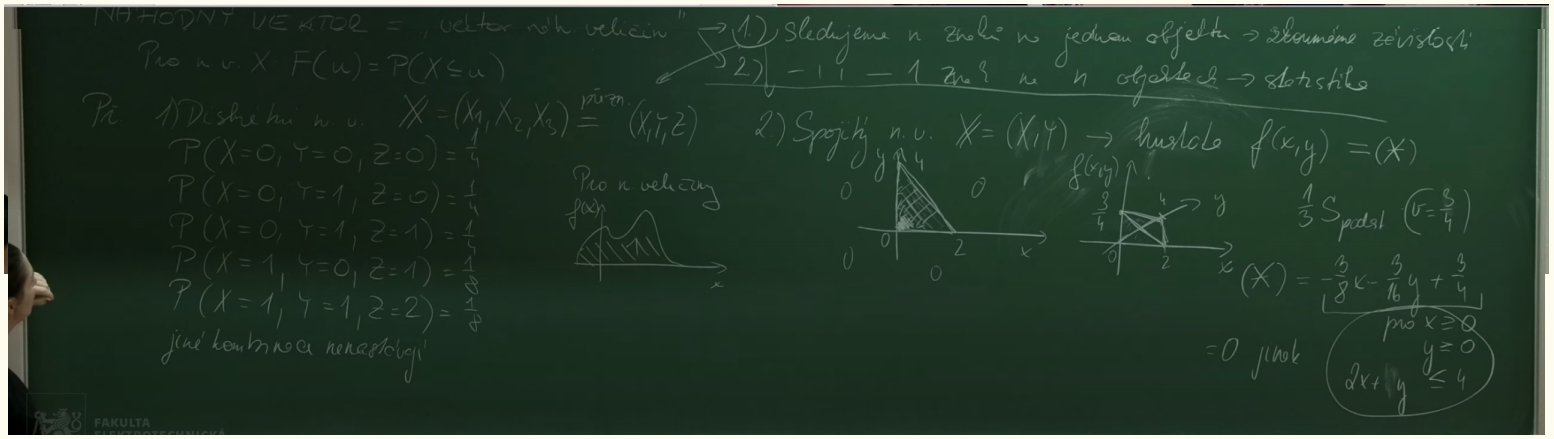
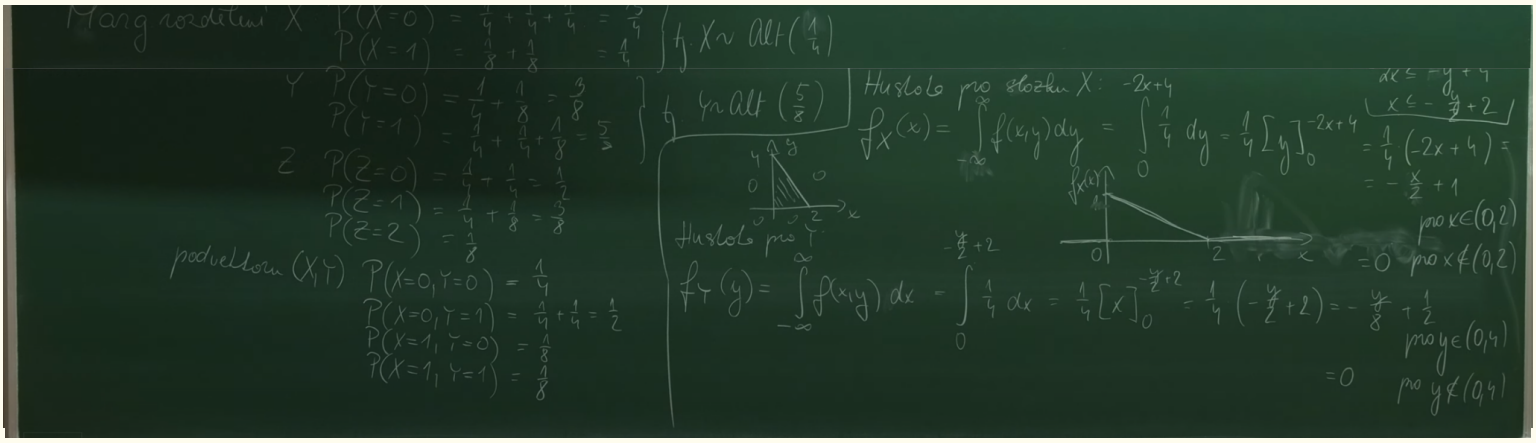




Př. $EX = (EX, EY, EZ) = (3/8, 5/8, 9/8)$

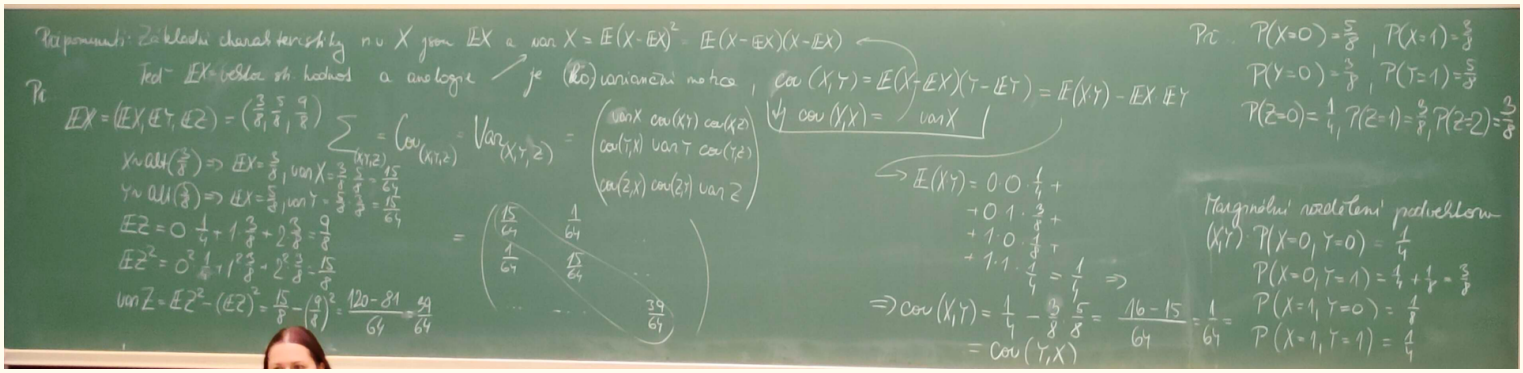
$X \sim Alt(3/8) \Rightarrow EX = 3/8$

$Y \sim Alt(5/8) \Rightarrow EY = 5/8$

$EZ = 0 \cdot 1/4 + 1 \cdot 3/8 + 2 \cdot 3/8 = 9/8$

$EZ^2 = 0^2 \cdot 1/4 + 1^2 \cdot 3/8 + 2^2 \cdot 3/8 = 15/8$

$\text{var}Z = EZ^2 - (EZ)^2 = 15/8 - (9/8)^2 = \frac{120 - 81}{64} = 39/64$



$$corr(X,Y) = \frac{cov(X,Y)}{\sqrt{var X}\sqrt{var Y}} = \frac{1/64}{\sqrt{15/64}\sqrt{15/64}} = \frac{1/64}{15/64} = 1/15$$

$$corr(X,X) = \frac{cov(X,X)}{\sqrt{var X}\sqrt{var X}} = \frac{var X}{var X} = 1$$

platí $|corr(X,Y)| = 1 \iff Y = aX + b$, kde $a > 0$

$= -1 \iff$ — II — , kde $a < 0$

$$\Sigma_{(X,Y,Z)} = Corr_{(X,Y,Z)} = \begin{pmatrix} corr(X,X) & corr(X,Y) & corr(X,Z) \\ corr(Y,X) & \cdots & \cdots \\ \cdots & \cdots & \cdots \end{pmatrix} =$$

$$= \begin{pmatrix} 1 & 1/15 & \cdots \\ 1/15 & 1 & \cdots \\ \cdots & \cdots & 1 \end{pmatrix}$$

Připomenutí: Nezávislost tří jevů A, B, C a D

$P(A \cap B \cap C \cap D) = P(A)P(B)P(C)P(D) \rightarrow$ Nezávislost n.v. X, Y, Z a U

$P(A \cap B \cap C) = P(A)P(B)P(C)$

$P(A \cap B \cap D) = P(A)P(B)P(D)$ } všechny trojice

$\vdots$

$P(A \cap B)$ } všechny dvojice

$P(X \le i, Y \le j, Z \le k, U \le l) = P(X \le i) P(Y \le j) P(Z \le k) P(U \le l)$

$P(X \le i, Y \le j, Z \le k) = P(X \le i) P(Y \le j) P(Z \le k)$

NEPOTŘEBUJEME

$P(X < i, Y < j) = P(X \le i) P(Y < j)$

$P(X \le i, Z \le k) = P(X \le i) P(Z \le k)$

všechny dvojice

$\forall i, j, k, l \in \mathbb{R}$

Př. Sdružení pdf n.v. X a Y

Y \ X	1	2	3	
0	1/12	0	1/6	$1/4 = P(Y=0)$
1	1/4	1/2	0	$3/4 = P(Y=1)$
	$= P(X=1)$	$= P(X=2)$	$= P(X=3)$	

tj. sčítání hodnot

Nezávislost → ověřit $P(X=i, Y=j) = P(X=i) P(Y=j), \forall i,j \in \mathbb{R}$

$P(X=1, Y=0) = \frac{1}{12} = \frac{1}{3} \cdot \frac{1}{4} = P(X=1) P(Y=0)$

⋮

pokud neexistuje

⇒ nejsou nezávislé

Y \ X	1	2	3	
0	1/12	1/8	1/24	1/4
1	1/4	3/8	1/8	3/4
	1/3	1/2	1/6	