



$$F(x) = \begin{cases} 0 & x \leq -5 \\ \frac{x+5}{4} & -5 < x < 5 \\ 1 & x \geq 5 \end{cases}$$

1) Nulová funkce:  $f(x) = \begin{cases} 0 & x \leq -5 \\ \frac{x+5}{4} & -5 < x < 5 \\ 0 & x \geq 5 \end{cases}$

2)  $P(-2 < X < 2) = \int_{-2}^2 f(x) dx = F(2) - F(-2) = \frac{7}{4} - \frac{3}{4} = 1$

$= F(2) - F(-2) = 1 - \frac{3}{4} = \frac{1}{4}$

3)  $P(X=2) = 0$   
 $\frac{d}{dx} F(x) = f(x)$   
 $P(X=2) = 0$

D.X. ...  $f(x) \Rightarrow F(x) \Rightarrow F(x)$   
 S.X. ...  $F(x) \Rightarrow f(x)$

$P(-c < X < c) = \int_{-c}^c f(x) dx = F(c) - F(-c)$

$P(X > 0) = 1 - P(X \leq 0) = 1 - F(0) = 1 - \frac{1}{4} = \frac{3}{4}$

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$$F(x, y) = F(x) \cdot F(y)$$

1)  $f_X(x) = \begin{cases} \frac{1}{2} & x=0 \\ \frac{1}{2} & x=1 \\ 0 & \text{jinak} \end{cases}$

$f_Y(y) = \begin{cases} \frac{1}{2} & y=0 \\ \frac{1}{2} & y=1 \\ 0 & \text{jinak} \end{cases}$

$F_X(x) = \begin{cases} 0 & x < 0 \\ \frac{1}{2} & 0 \leq x < 1 \\ 1 & x \geq 1 \end{cases}$

$F_Y(y) = \begin{cases} 0 & y < 0 \\ \frac{1}{2} & 0 \leq y < 1 \\ 1 & y \geq 1 \end{cases}$

$f_{X,Y}(x,y) = \begin{cases} \frac{1}{4} & x=0, y=0 \\ \frac{1}{4} & x=0, y=1 \\ \frac{1}{4} & x=1, y=0 \\ \frac{1}{4} & x=1, y=1 \\ 0 & \text{jinak} \end{cases}$

$F_{X,Y}(x,y) = \begin{cases} 0 & x < 0 \text{ or } y < 0 \\ \frac{1}{4} & 0 \leq x < 1, 0 \leq y < 1 \\ \frac{1}{2} & 0 \leq x < 1, y \geq 1 \\ \frac{3}{4} & x \geq 1, 0 \leq y < 1 \\ 1 & x \geq 1, y \geq 1 \end{cases}$

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X \ Y	0	1	2
0	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$
1	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$
2	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$

$F(x,y)$

x \ y	0	1	2
0	$\frac{1}{6}$	$\frac{2}{6}$	$\frac{3}{6}$
1	$\frac{1}{6}$	$\frac{2}{6}$	$\frac{3}{6}$
2	$\frac{1}{6}$	$\frac{2}{6}$	$\frac{3}{6}$

$F(0,0) = \frac{1}{6}$   
 $F_X(0) \cdot F_Y(0) = \frac{1}{6} \cdot \frac{1}{6} = \frac{1}{36}$

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$f(x,y) = 2xy \cdot f_X(x) \cdot f_Y(y)$

$F(x,y) = F(x) \cdot F(y)$

$F_X(x) = \int_0^x 2t \cdot f(t) dt = \int_0^x 2t \cdot t dt = \int_0^x 2t^2 dt = \frac{2}{3} t^3 \Big|_0^x = \frac{2}{3} x^3$

$F_Y(y) = \int_0^y 2t \cdot f(t) dt = \int_0^y 2t \cdot t dt = \int_0^y 2t^2 dt = \frac{2}{3} t^3 \Big|_0^y = \frac{2}{3} y^3$

$F_{X,Y}(x,y) = \int_0^x \int_0^y 2xy \cdot f(x) \cdot f(y) dx dy = \int_0^x \int_0^y 2xy \cdot x \cdot y dx dy = \int_0^x \int_0^y 2x^2 y^2 dx dy = \int_0^x \frac{2}{3} x^3 y^2 dy = \frac{2}{3} x^3 \cdot \frac{1}{3} y^3 \Big|_0^y = \frac{2}{9} x^3 y^3$

$F_X(x) = \int_0^x 2t \cdot f(t) dt = \int_0^x 2t^2 dt = \frac{2}{3} x^3$

$F_Y(y) = \int_0^y 2t \cdot f(t) dt = \int_0^y 2t^2 dt = \frac{2}{3} y^3$

$F_{X,Y}(x,y) = \int_0^x \int_0^y 2xy \cdot f(x) \cdot f(y) dx dy = \frac{2}{9} x^3 y^3$

S.N.

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