

NOM:

PRENOM:

X

$p \in]0,1[$

$P(X = k), k = 1, 2, \dots, X$

$$P(X = k) = P(k-1 \text{ fois face et face au } k\text{ème essai}) = (1-p)^{k-1} p, k = 1, \dots$$

Y

$Y = 5$

$P(Y = k), k = 2, 3, \dots, Y$

$$P(Y = k) = P(\text{pile en } k) \times P(\text{une fois pile entre } 1 \text{ et } k-1)$$

$$P(\text{une fois pile entre } 1 \text{ et } k-2 \text{ fois faces sur } \{1, \dots, k-1\}) = (1-p)^{k-2} p(k-1) \dots (k-1) \dots \{1, \dots, k-1\}$$

$$P(Y = k) = p(k-1)(1-p)^{k-2} p = (k-1)(1-p)^{k-2} p^2$$

X

$$\forall x \in [0, 2]: F_X(x) = \alpha x(x-4)$$

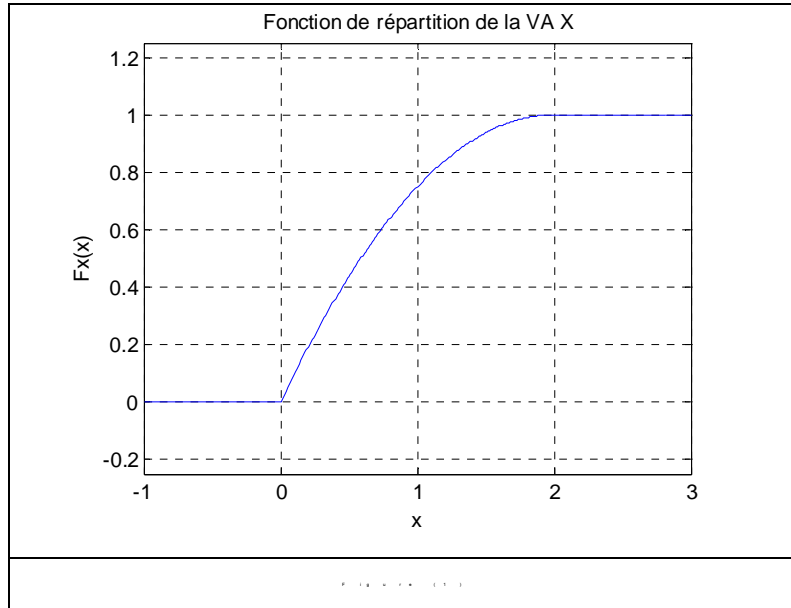
$$\alpha = -1/4 \dots P(X \geq 1 / X \geq 0.5)$$

$$F_X(2) = \alpha 2(-2) = 1 \Rightarrow \alpha = -1/4$$

$$P(X \geq 1 / X \geq 0.5) = P(X \geq 1) / P(X \geq 0.5) = (1 - F_X(1)) / (1 - F_X(0.5)) = (1/4) / (9/16) = 4/9$$

NOM:

PRENOM:



$p_X(x)$ $x \in \mathbb{R}$

$E(X)$

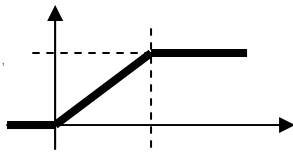
$$p_X(x) = 0, x < 0 \text{ ou } x > 2$$

$$= (1 - x/4) - x/4 = 1 - x/2, x \in (0, 2)$$

$$E(X) = \int_0^2 x(1 - x/2) dx = \left[x^2/2 - x^3/6 \right]_0^2 = 2/3$$

Y $[0, 2]$ X

F_Y



$$F_Y(y) = y/2, y \in [0, 2]$$

$Z = \max(Y, X)$ $F_Z(z) = P(Z < z)$ $z < 0$ $z > 2$ $0 \leq z \leq 2$

$$P(Z < z) = P(X < z, Y < z) = P(X < z)P(Y < z) = F_X(z)F_Y(z)$$

$$= 0, z \leq 0$$

$$= 1, z \geq 2$$

$$= (z/2)(1 - z/4) = (z^2/2)(1 - z/4), 0 < z < 2$$