$F_Y(y) = F_X(y^{1/p}) - F_X(-y^{1/p}) \quad y \in]0,+\infty[$.

$f_Y(y) = \frac{1}{p} y^{\frac{1}{p}-1} [f_X(y^{1/p}) + f_X(-y^{1/p})]$.

Application : Si $X \to N(0,1)$. la loi de $Y = X^2$.

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

$f_Y(y) = \frac{1}{2} y^{-\frac{1}{2}} [f_X(y^{\frac{1}{2}}) + f_X(y^{-\frac{1}{2}})]$

$f_{X^2}(y) = \frac{1}{\sqrt{2\pi}} y^{-\frac{1}{2}} e^{(-\frac{y}{2})}$

$\Rightarrow X^2 \to \Gamma(\frac{1}{2}, \frac{1}{2})$.

Ex 11

$X \to \exp(k)$.

1) pour $k = 0{,}8$. calculer la pb

a) $P(X > 4)$

b) $P(3 < X < 5)$.

$X \to \exp(k) \Rightarrow f_X(x) = k e^{-kx} \quad]0,+\infty[$

a) $P(X > 4) = \int_4^{+\infty} k e^{-kx} dx = [-k e^{-kx}]_4^{+\infty} = e^{-4k}$ remplacer $k = 0{,}8$

b) $P(3 < X < 5) = \int_3^5 k e^{-kx} dx = [-k e^{-kx}]_3^5$

$= e^{-2{,}4} - e^{-4}$.

2) $P(X > 3) = 0{,}1$

$P(X > 3) = \int_3^{+\infty} k e^{-kx} dx = e^{-3k} \Rightarrow e^{-3k} = 0{,}1$ page 10

$\Rightarrow k = \frac{\ln 10}{3}$.