EX, f_y, EY, DX, DY

$Cov(X,Y)$, $Cor(X,Y)$

$$EX = \int_0^3 x \cdot \frac{1}{3}\left(2 - \frac{2}{3}x\right) dx = \frac{2}{3}\left(\frac{9}{2} - 9\right)$$

$$\frac{2}{3}\int_0^3 x(1-x)\,dx = \frac{2}{3}\left[\frac{x^2}{2} - \frac{x^3}{9}\right]_0^3 = \frac{2}{3}\left(\frac{9}{2} - 3\right) = 1$$

$$DX = EX^2 - (EX)^2$$

$$= \int_0^3 x^2 \frac{2}{3}\left(1 - \frac{x}{3}\right) dx - 1 = \frac{2}{3}\left[\frac{x^3}{3} - \frac{x^4}{12}\right]_0^3 - 1 = \frac{2}{3}\left(27 - \frac{81}{12}\right) - 1 = \dots = \frac{1}{2}$$

$$f_Y(y) = \int_{-\infty}^{\infty} f_{X,Y}(x,y)\,dx = \int_0^{3-\frac{3}{2}y} \frac{1}{3}\,dx = \frac{1}{3}\left(3 - \frac{3}{2}y\right) = 1 - \frac{y}{2} \quad za\ y \in (0,2)$$

$$EY = \int_0^2 y\left(1 - \frac{y}{2}\right) dy = \left[\frac{y^2}{2} - \frac{y^3}{6}\right]_0^2 = 2 - \frac{4}{3} = \frac{2}{3}$$

Ano. $DY = \int_0^2 y^2\left(1 - \frac{y}{2}\right) dy - \left(\frac{2}{3}\right)^2 = \dots = \frac{2}{9}$

$Cov = EXY - EX\,EY$

$$EXY = \iint_{\Delta} xy \cdot \frac{1}{3}\,dx\,dy = \int_0^2 \int_0^{3-\frac{3}{2}y} \frac{xy}{3}\,dx\,dy = \int_0^2 \frac{y}{3}\left(\frac{3 - \frac{3}{2}y}{2}\right)^2 dy = \frac{1}{2}$$

$$\Rightarrow Cov(X,Y) = \frac{1}{2} - 1\frac{2}{3} = \dots$$

$$Cor(X,Y) = \frac{Cov(X,Y)}{\sqrt{\frac{1}{2}}\sqrt{\frac{2}{9}}} = \dots$$

$\in [-1;1]$