Z8)

$Y_1 = 2X_1 - 3X_2 \qquad Y_2 = 4X_1 + 2X_2 \qquad X = (X_1, X_2)^T$

$Y = AX \qquad A = \begin{bmatrix} 2 & -3 \\ 4 & 2 \end{bmatrix}$

$A\begin{bmatrix} 1 \\ 4 \end{bmatrix} = \begin{bmatrix} -10 \\ 12 \end{bmatrix} \qquad A\begin{bmatrix} 38 & -5 \\ -5 & 4 \end{bmatrix}A^T = \begin{bmatrix} 81 & -22 \\ 142 & -12 \end{bmatrix}A^T = \begin{bmatrix} 248 & 320 \\ 320 & 544 \end{bmatrix}$

$X \sim N\left(\begin{bmatrix} -10 \\ 12 \end{bmatrix}, \begin{bmatrix} 248 & 320 \\ 320 & 544 \end{bmatrix}\right)$

↑ wektor oczekiwań

↑ macierz kowariancji

$\rho_{Y_1,Y_2} = \dfrac{\mathrm{cov}(Y_1, Y_2)}{\sqrt{V(Y_1)\,V(Y_2)}} = \dfrac{320}{\sqrt{248 \cdot 544}} = \dfrac{320}{16\sqrt{527}} = \dfrac{20\sqrt{527}}{527}$