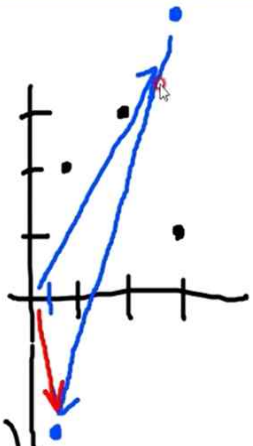
공분산 행렬

$$COV = \begin{bmatrix} V(x) & cov(x,y) \\ cov(x,y) & V(y) \end{bmatrix}$$



문제 1) X=[1,2,3], Y=[2,3,1]일 때, 공분산 행렬은?

$V(X) = \frac{2}{3}$ $V(Y) = \frac{2}{3}$

$Cov(X,Y) = \frac{0+0+(-1)}{3} = -\frac{1}{3}$

$$COV = \begin{pmatrix} \frac{2}{3} & -\frac{1}{3} \\ -\frac{1}{3} & \frac{2}{3} \end{pmatrix}$$

문제 2) (3,5)는 공분산 행렬에 의해 mapping이 되면 어떻게 변하는가?

$$(3\ 5)\begin{pmatrix} \frac{2}{3} & -\frac{1}{3} \\ -\frac{1}{3} & \frac{2}{3} \end{pmatrix} = \left(\frac{6}{3} - \frac{5}{3} \quad -1+\frac{10}{3}\right) = \left(\frac{1}{3} \quad \frac{7}{3}\right)$$