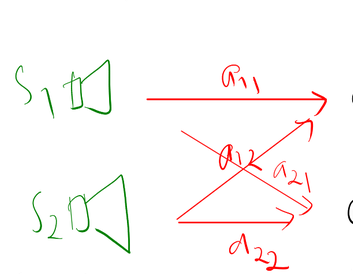
ICA (Independent Component Analysis)



Sources

Component

$x_1 = a_{11} s_1 + a_{12} s_2$

$x_2 = a_{21} s_1 + a_{22} s_2$

matriks pencampuran

$X = A\,S$ → goal = estimasi sinyal S

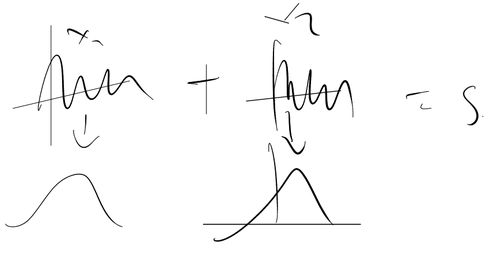
$\underline{X} = \sum_{i=1}^{n} a_i s_i$

$x_1 = a_{11} s_1 + a_{12} s_2$

$X = A\,s$

$s = A^{-1} \cdot x$

$y = Wx$, $W = A^{-1}$



$y = W^T x \rightarrow y = W^T A s$

$z = A^T W$

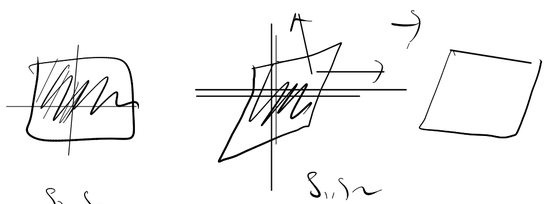
$z^T = A W^T$

$y = z^T s$

$y = z^T \cdot s$

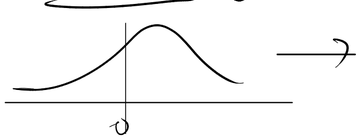
2×2

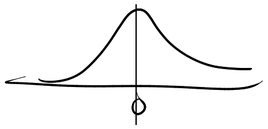
$W = \begin{pmatrix} 2 & 3 \\ 2 & 1 \end{pmatrix}$



Steps :

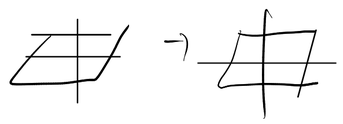
① Centering

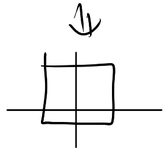


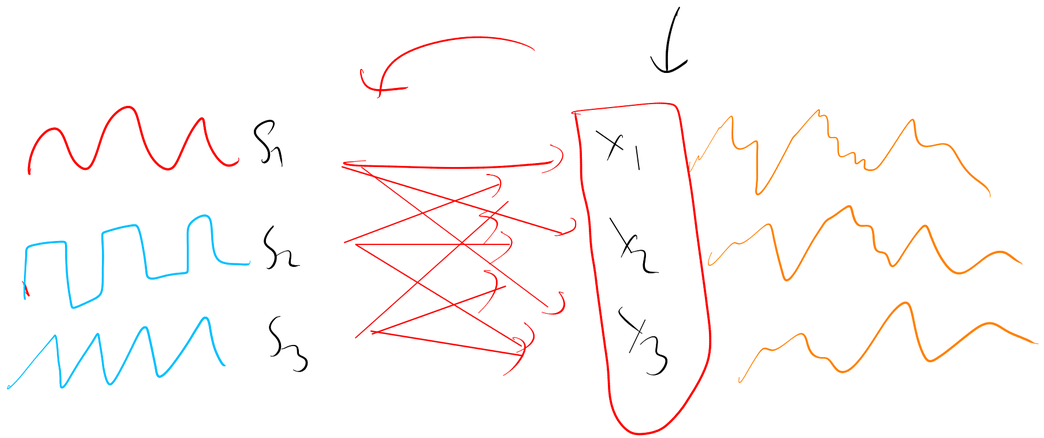


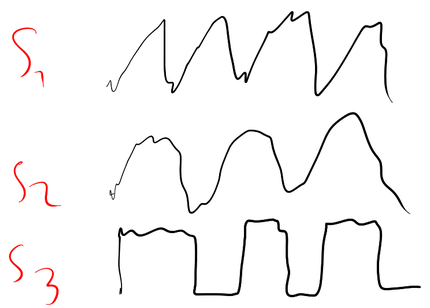
② Whitening

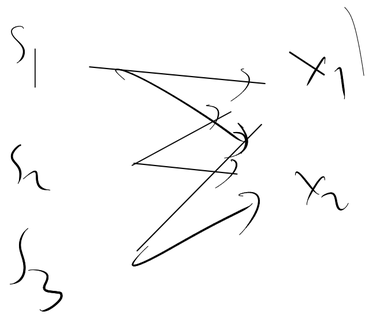
③ Rotating

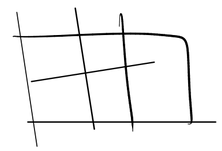












$$Y = A\,S \rightarrow x = \sum a_i\, s_i$$

$$x_1 = a_{11}\, s_1 + a_{12}\, s_2 + a_{13}\, s_3$$

$$x_2 = a_{21}\, s_1 + a_{22}\, s_2 + a_{23}\, s_3$$

$$x_3 = a_{31}\, s_1 + a_{32}\, s_2 + a_{33}\, s_2$$