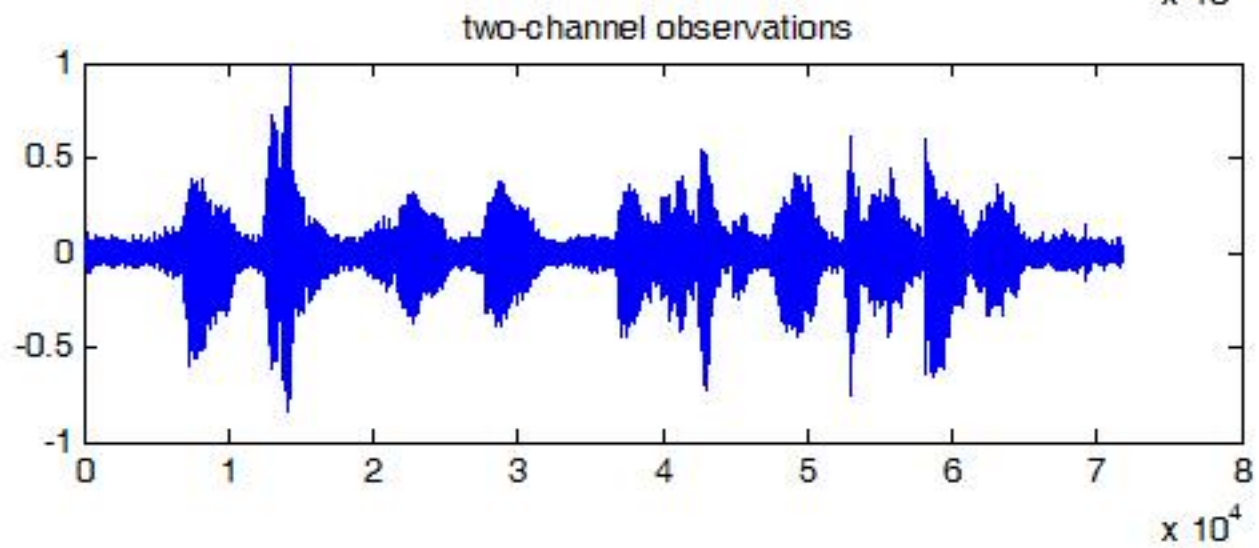
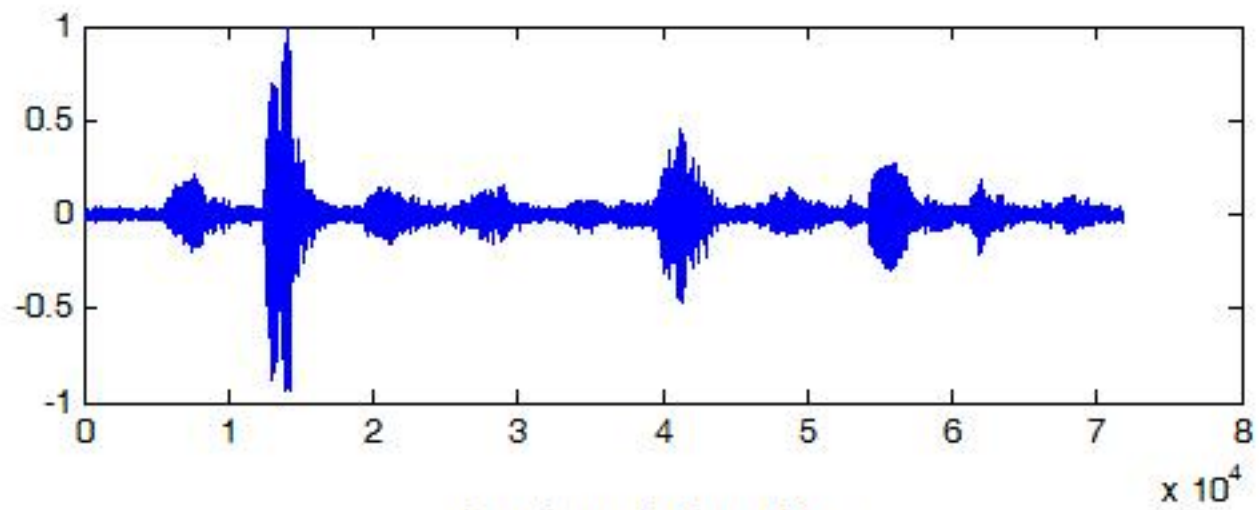
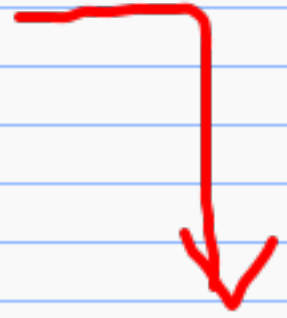
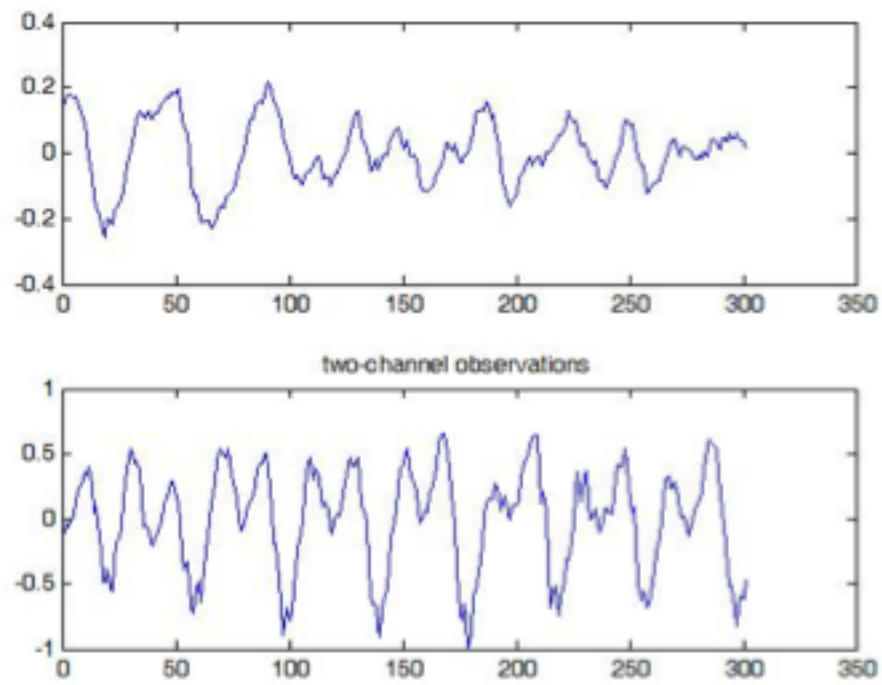


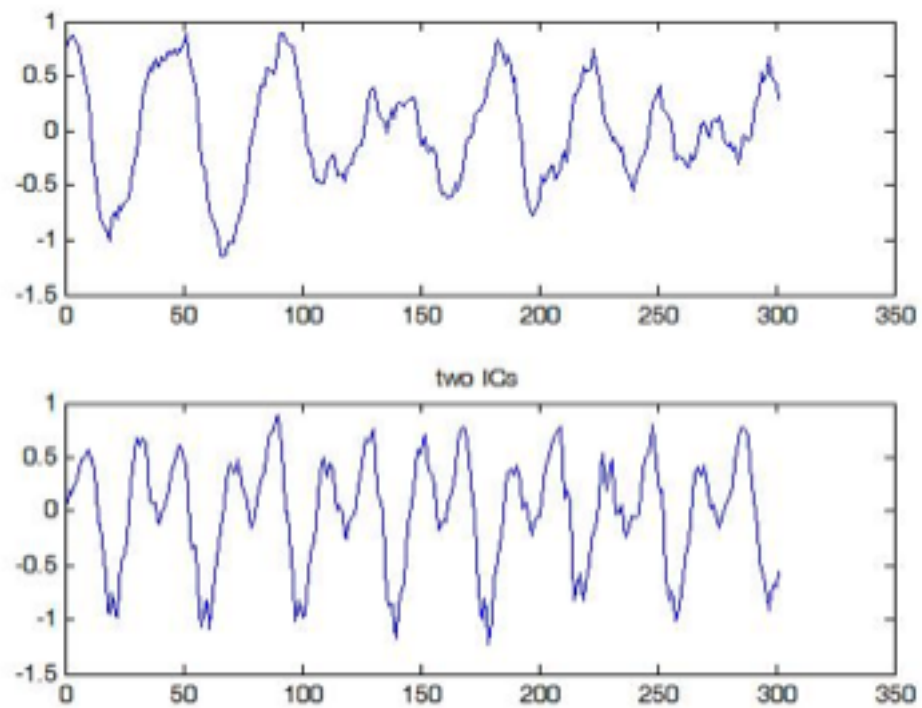
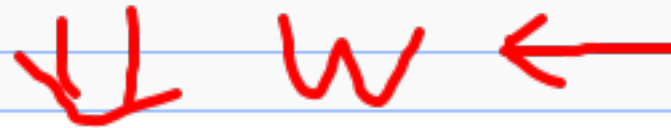
Separation of artificially mixed signals of two independent speeches

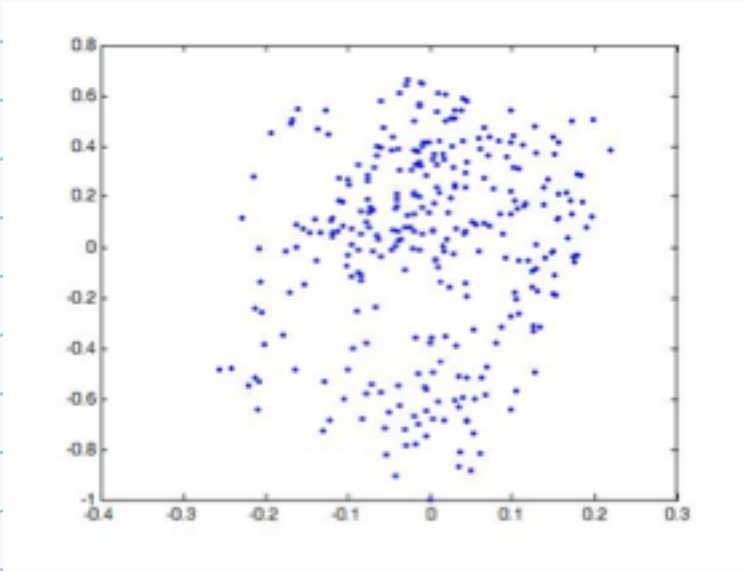
Example 1



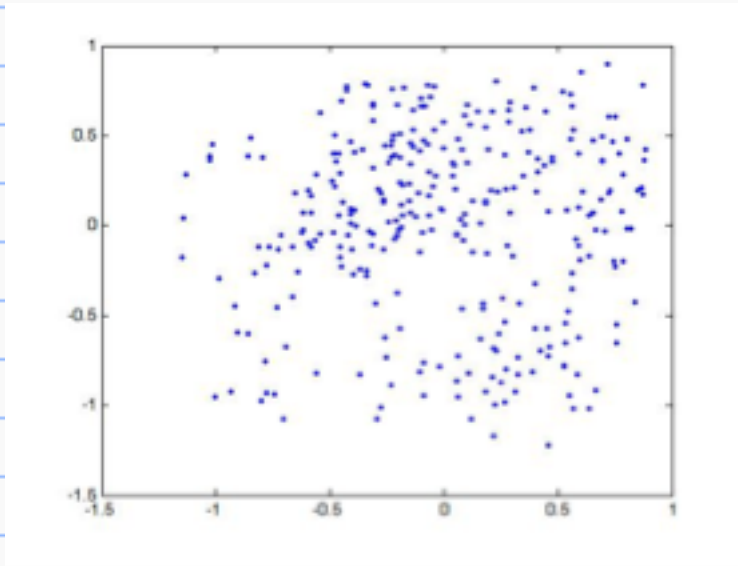


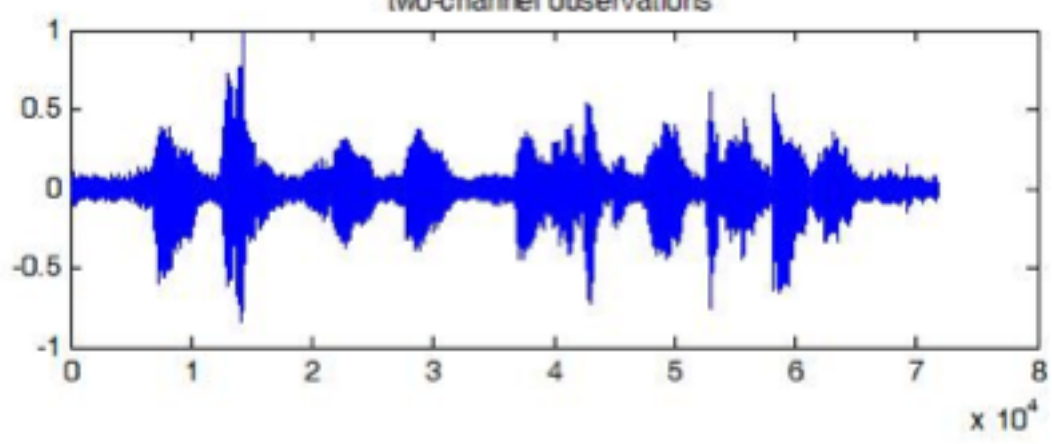
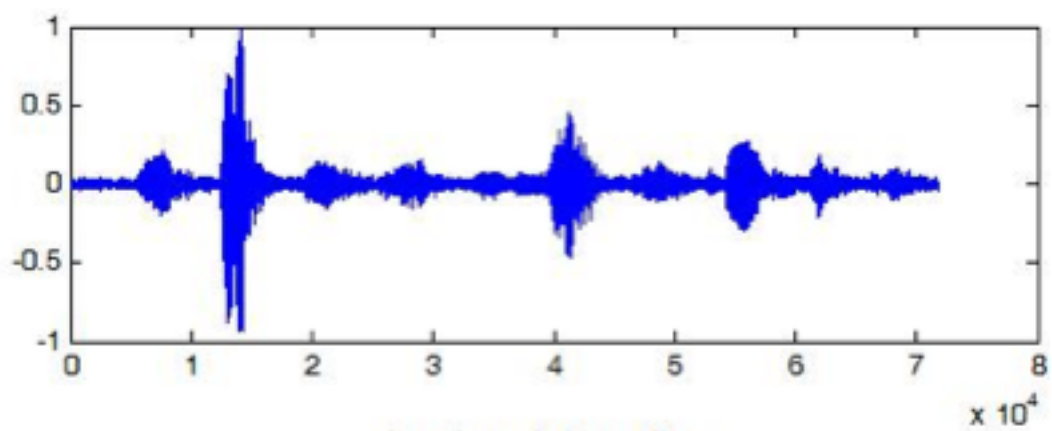
PottsICA



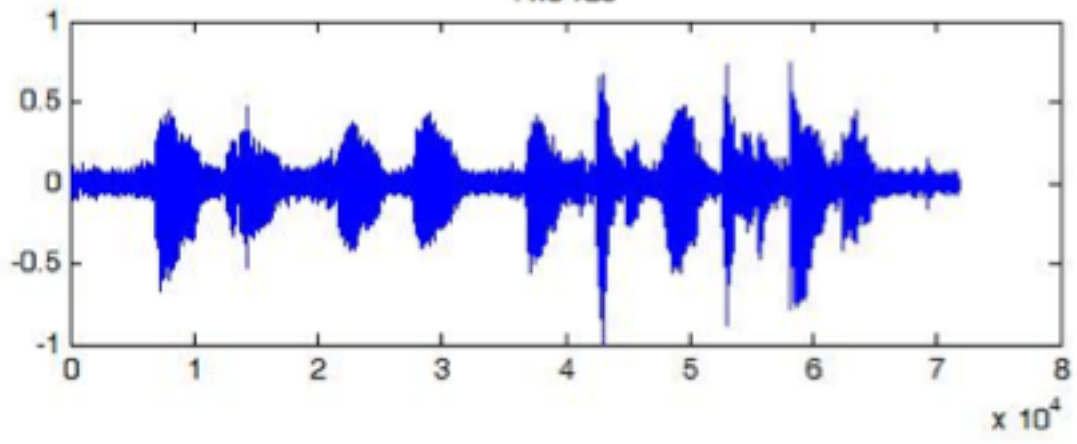
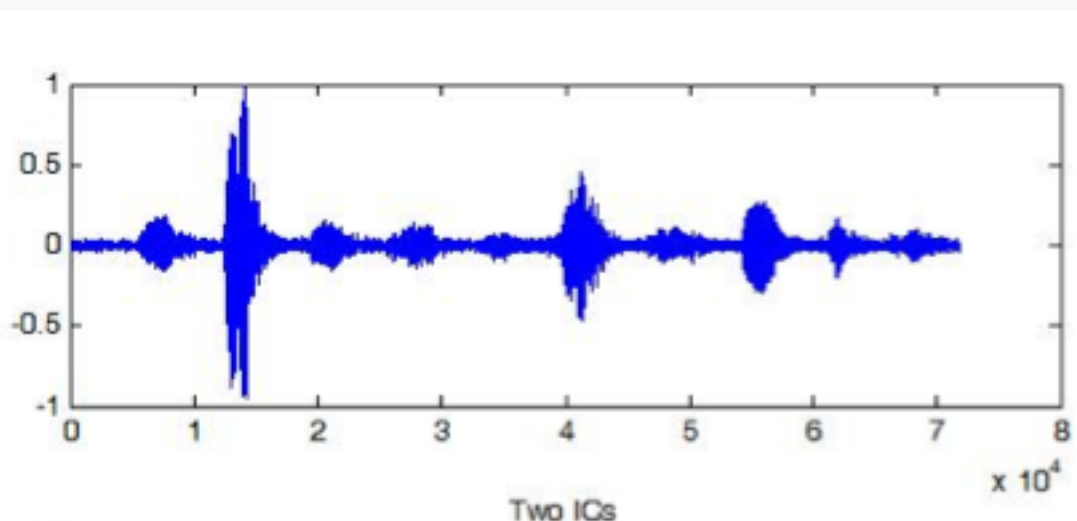


↓ w

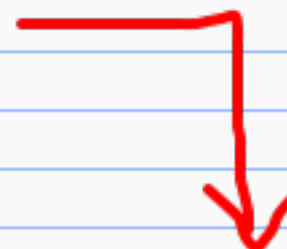
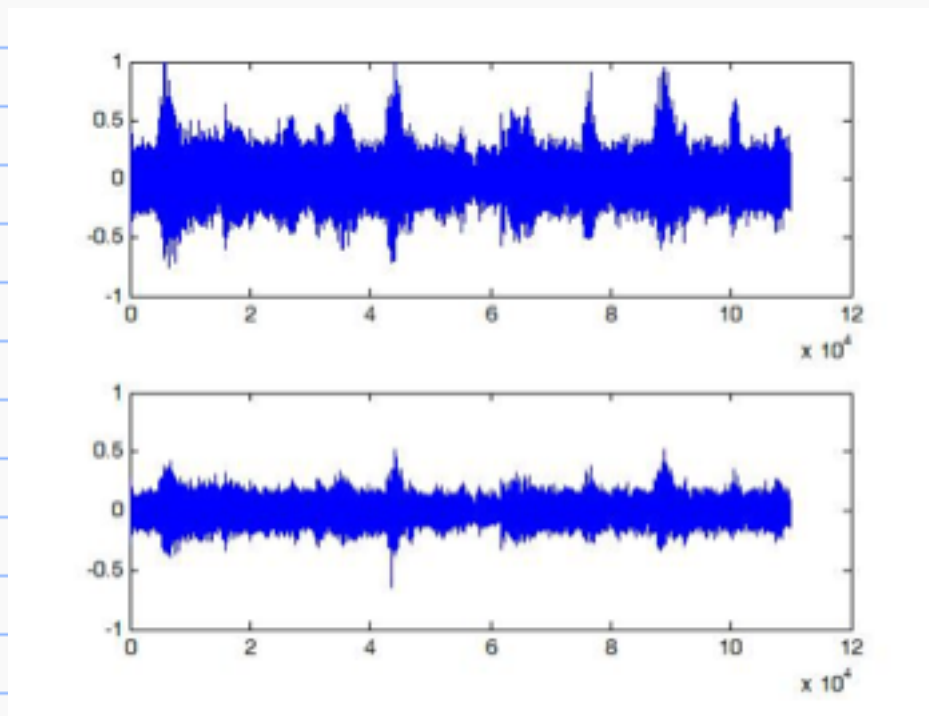




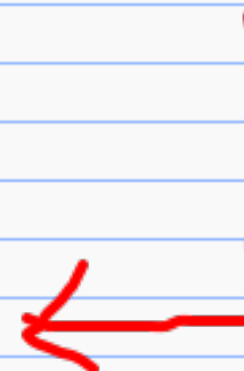
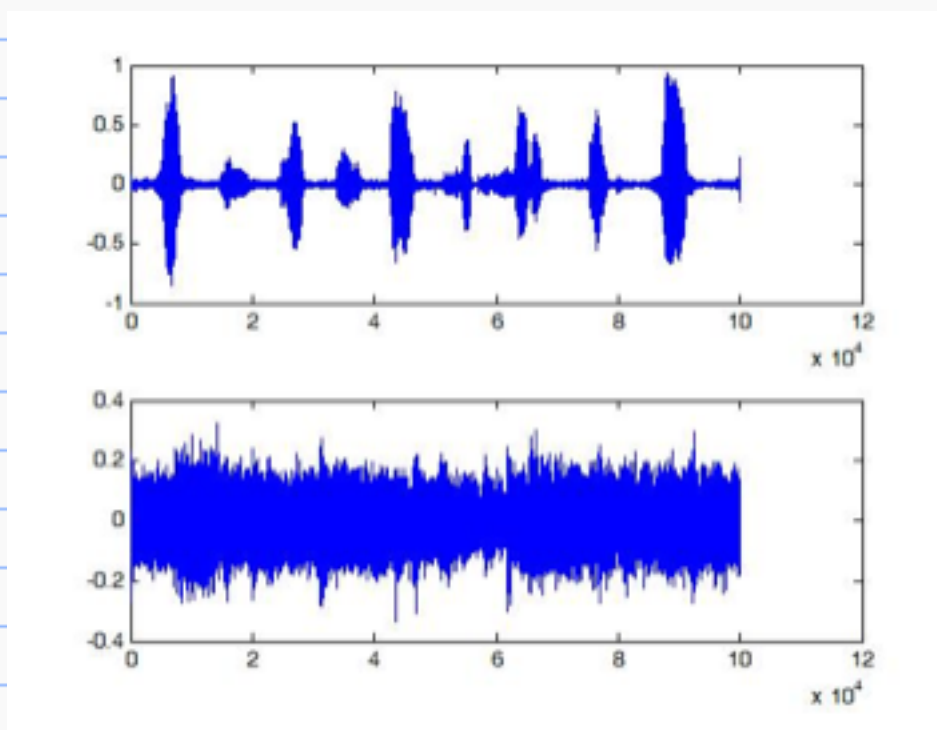
W



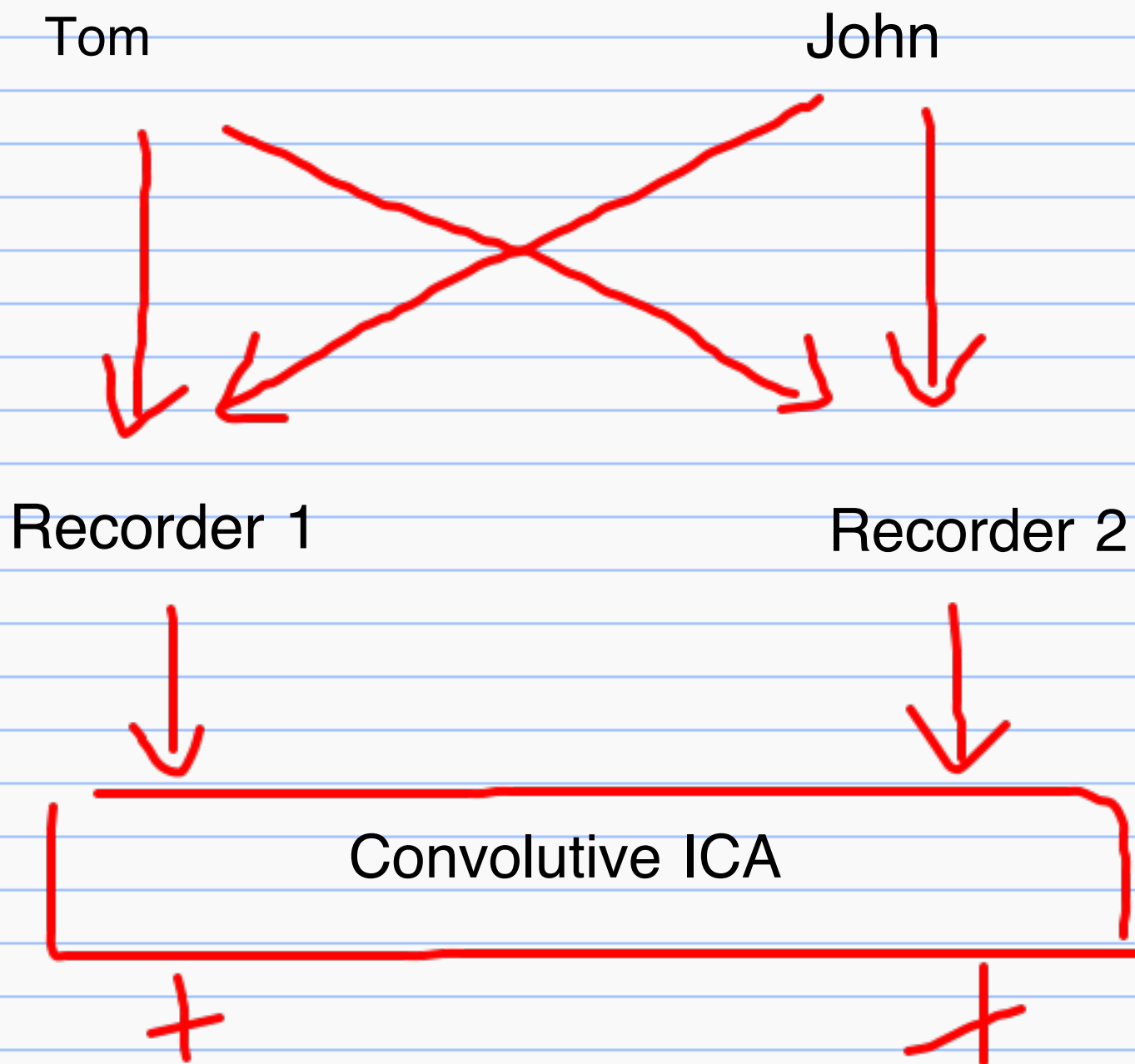
Example 2 blind separation of two recordings of sources of music and speech



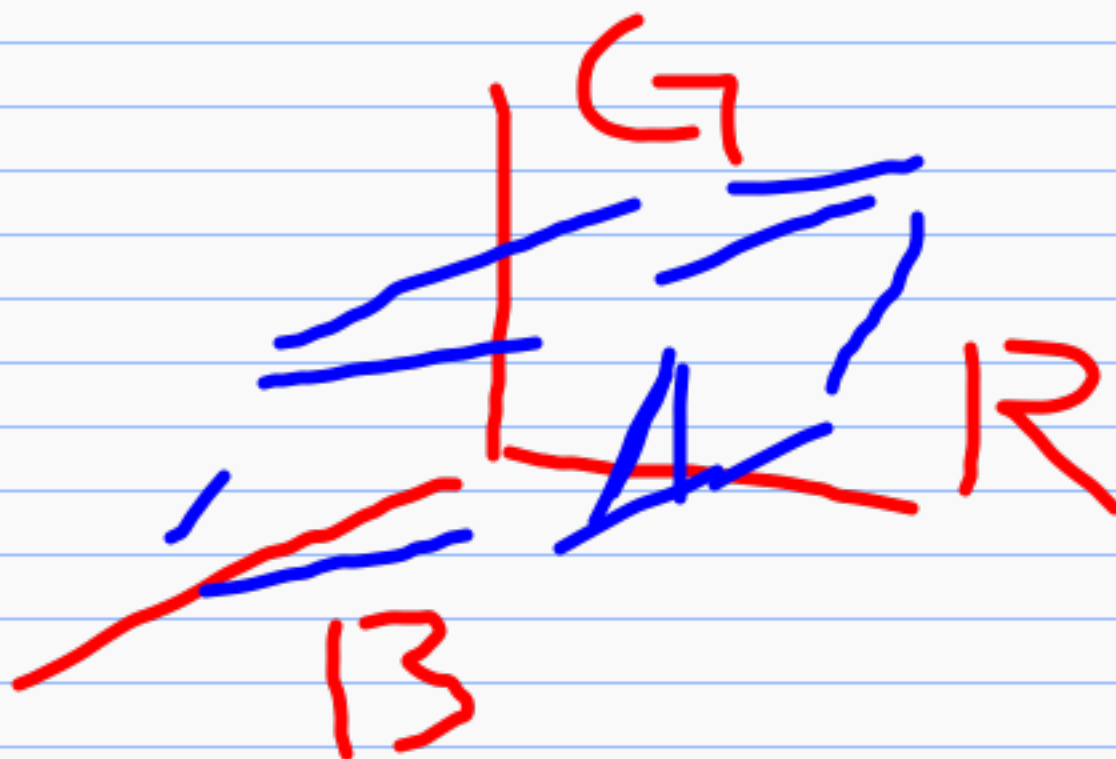
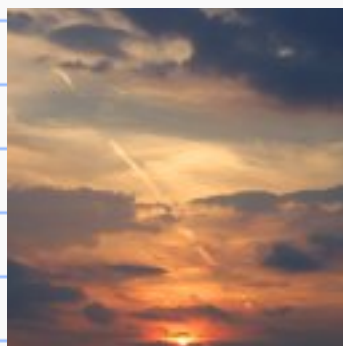
Convolutional ICA



Example 3 blind separation of recordings of two speeches



RGB transformation



Matrix-type projection for dimensionality reduction

$$W_{n \times n}$$

$$\mathbb{R}^m \rightarrow A_{n \times m} \rightarrow \mathbb{R}^n$$

$$x = AS$$

$$?? \quad \underline{n \ll m}$$

M distance
Data rotation

$$X = AS$$

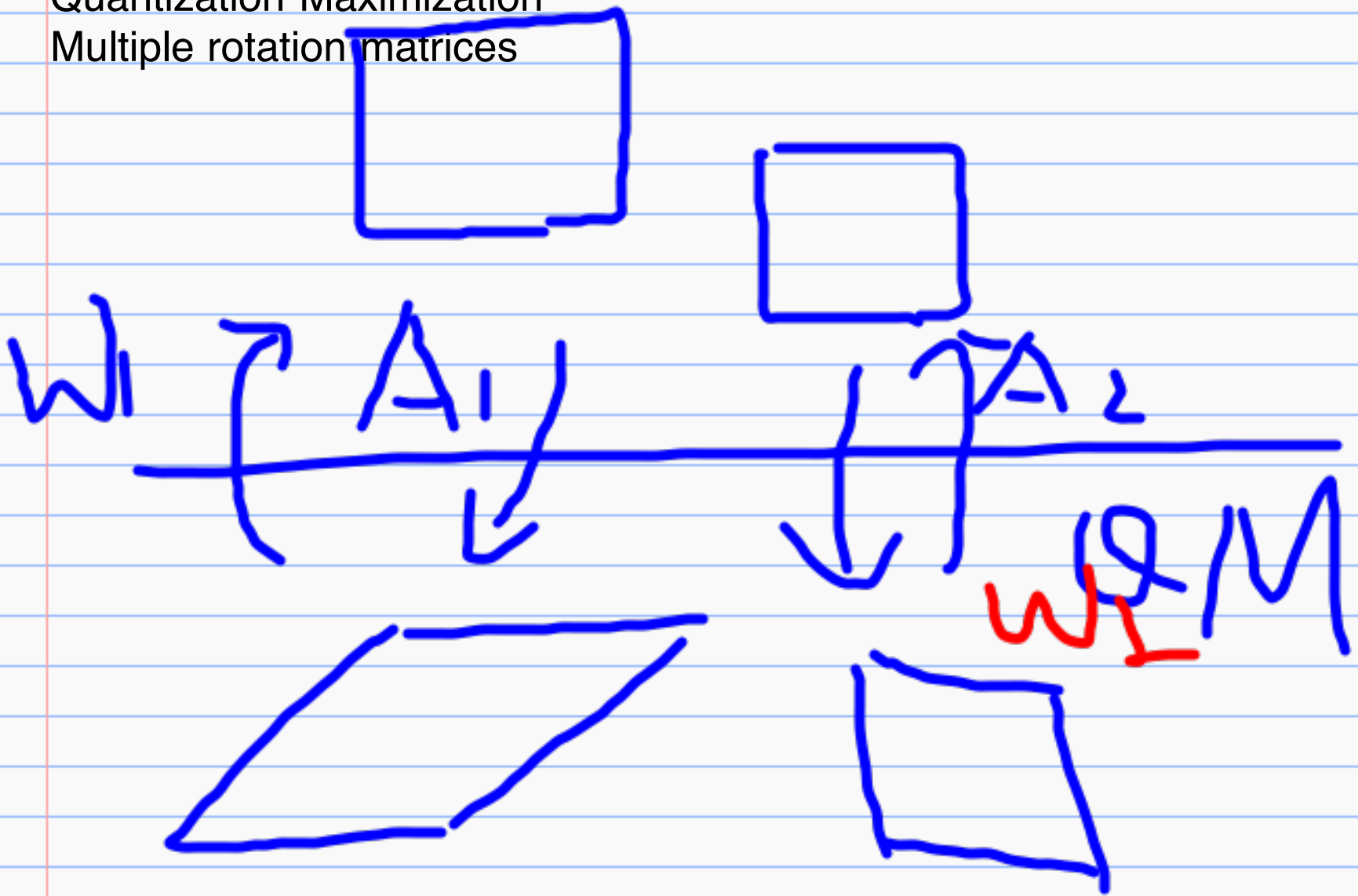
$$y = Wx$$

$$\|y\|_H^2 = y^T y$$

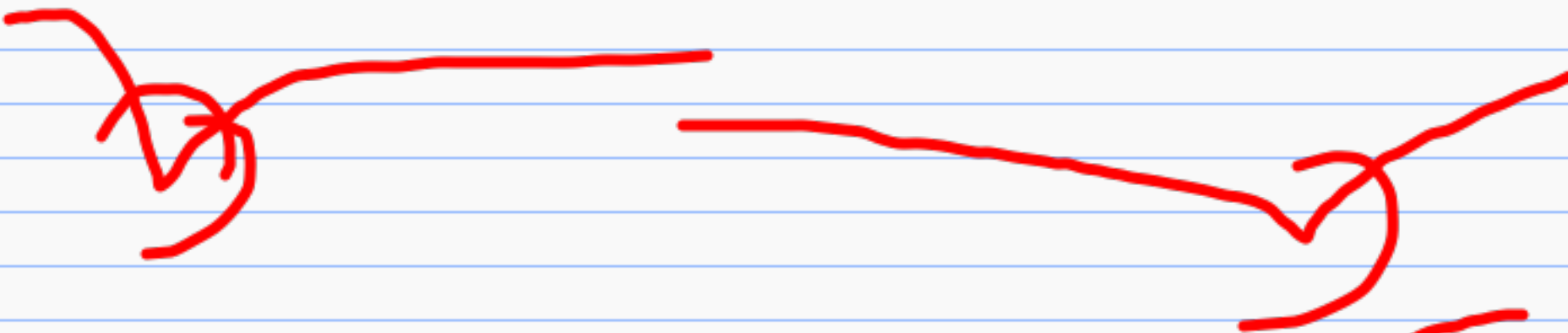
$$= x^T W^T W x$$

$$= \|x\|_D^2, \quad \underline{\underline{D = W^T W}}$$

Quantization Maximization
Multiple rotation matrices



Hill Valley Recognition



Hand written character recognition

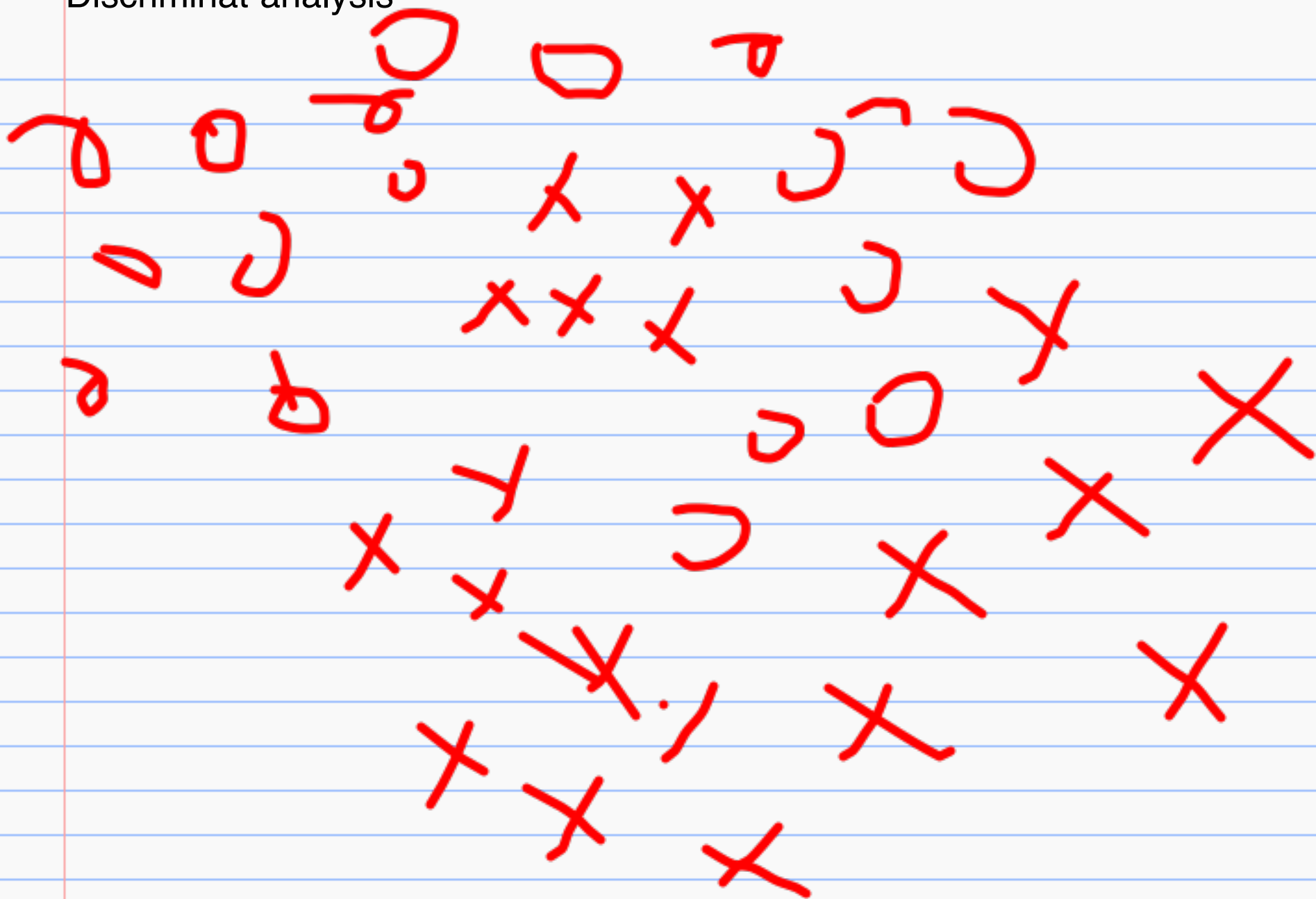
o

o

a

a

Discriminat analysis



Boundary support approximation



PCA

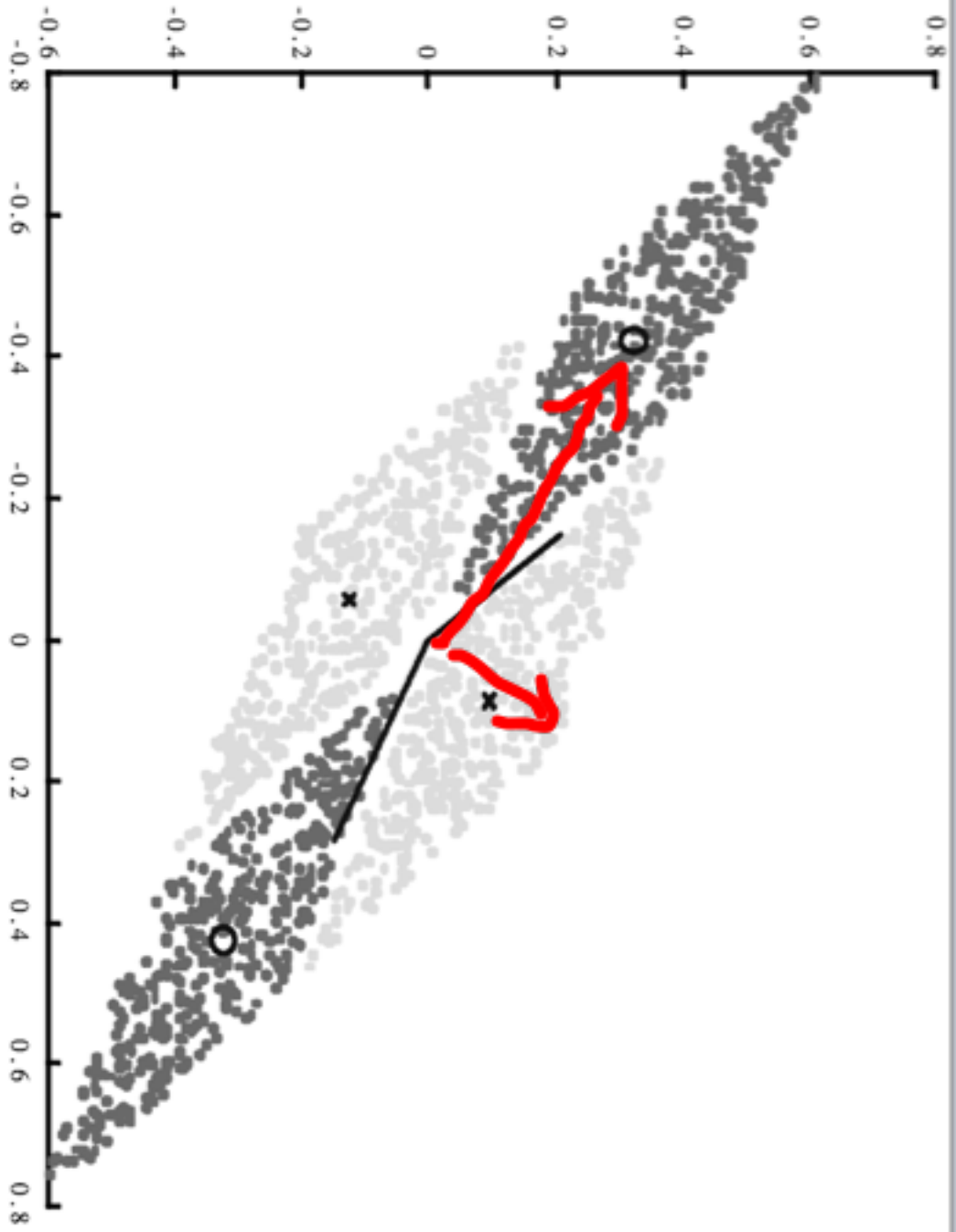


Figure 2: The training patterns of the first example and the result of the learning

Principle component analysis

$$M = \sum_t x[t] x[t]^T \in \mathbb{R}^{2 \times 2}$$

$$\frac{1}{N} \sum_t x[t] x[t]^T$$

$$\text{eig}(M) \quad 2 \times 2$$

