

5 Preprocessing for ICA

In the preceding section, we discussed the statistical principles underlying ICA methods. Practical algorithms based on these principles will be discussed in the next section. However, before applying an ICA algorithm on the data, it is usually very useful to do some preprocessing. In this section, we discuss some preprocessing techniques that make the problem of ICA estimation simpler and better conditioned.

5.1 Centering

The most basic and necessary preprocessing is to center \mathbf{x} , i.e. subtract its mean vector $\mathbf{m} = E\{\mathbf{x}\}$ so as to make \mathbf{x} a zero-mean variable. This implies that \mathbf{s} is zero-mean as well, as can be seen by taking expectations on both sides of Eq. (4).

This preprocessing is made solely to simplify the ICA algorithms: It does not mean that the mean could not be estimated. After estimating the mixing matrix \mathbf{A} with centered data, we can complete the estimation by adding the mean vector of \mathbf{s} back to the centered estimates of \mathbf{s} . The mean vector of \mathbf{s} is given by $\mathbf{A}^{-1}\mathbf{m}$, where \mathbf{m} is the mean that was subtracted in the preprocessing.