

2.3 Illustration of ICA

To illustrate the ICA model in statistical terms, consider two independent components that have the following uniform distributions:

$$p(s_i) = \begin{cases} \frac{1}{2\sqrt{3}} & \text{if } |s_i| \leq \sqrt{3} \\ 0 & \text{otherwise} \end{cases} \quad (7)$$

The range of values for this uniform distribution were chosen so as to make the mean zero and the variance equal to one, as was agreed in the previous Section. The joint density of s_1 and s_2 is then uniform on a square. This follows from the basic definition that the joint density of two independent variables is just the product of their marginal densities (see Eq. 10): we need to simply compute the product. The joint density is illustrated in Figure 5 by showing data points randomly drawn from this distribution.