



**Definition**

Consider a random variable  $x : \Omega \rightarrow \mathbf{R}^n$ . The error of the estimate  $\xi \in \mathbf{R}^n$  is the random variable  $e : \Omega \rightarrow \mathbf{R}^n$  which is defined by  $e(\omega) = x(\omega) - \xi$ . The *bias* of an estimate is the expected value of the error. An estimate is *unbiased* if it has zero bias.

Likewise, if we have another random variable  $y : \Omega \rightarrow \mathbf{R}^m$ , then the error of the estimator  $f : \mathbf{R}^m \rightarrow \mathbf{R}^n$  is the random variable  $e : \Omega \rightarrow \mathbf{R}^n$  defined by  $e(\omega) = f(x(\omega)) - y(\omega)$ .



