



**Why**

We want to guess random variables.

**Definition**

Let  $(\Omega, \mathcal{A}, \mathbf{P})$  be a probability space. Let  $x : \Omega \rightarrow V$  be a random variable. An *estimate* or *prediction* or *guess* for  $x$  is a value  $v \in V$ . Some authors call the selection of an estimate *estimation* or an *estimation problem*.

**Cost functions**

A *cost function* for an estimate in  $V$  is a function  $C : V \times V \rightarrow \mathbf{R}$ . A cost function is also known as a *risk function*. The *cost* of an estimate is a random variable  $c : \Omega \rightarrow \mathbf{R}$  which is  $c(\omega) = C(x(\omega), \xi)$ .



