



# Correlation

## 1 Why

TODO

## 2 Definition

The *correlation* between two integrable real-valued random variables with non-zero variance is the quotient of their covariance with the product of their standard deviations.

Two integrable real-valued random variables are *uncorrelated* if their covariance is zero. We can speak of uncorrelated random variables who have zero variance, although in this case their correlation is undefined.

### 2.1 Notation

Let  $f$  and  $g$  be two integrable real-valued random variables with  $fg$  integrable. Denote the correlation of  $f$  with  $g$  by  $\mathbf{cor}(f, g)$ . We defined it:

$$\mathbf{cor}(f, g) = \frac{\mathbf{cov}(f, g)}{\mathbf{std} f \mathbf{std} g}.$$