Definition 8.1 A single-letter distortion measure is a mapping

$$d : \mathcal{X} \times \hat{\mathcal{X}} \to \Re^+.$$

The value $d(x, \hat{x})$ denotes the distortion incurred when a source symbol x is reproduced as $\hat{x}$.

Definition 8.2 The average distortion between a source sequence $\mathbf{x} \in \mathcal{X}^n$ and a reproduction sequence $\hat{\mathbf{x}} \in \hat{\mathcal{X}}^n$ induced by a single-letter distortion measure d is defined by

$$d(\mathbf{x}, \hat{\mathbf{x}}) = \frac{1}{n} \sum_{k=1}^{n} d(x_k, \hat{x}_k).$$