

## 0.1 Chapter 2

$$H(X) = -\sum p(x) \log p(x) = E_p \log \frac{1}{p(x)} \quad (0.1.1)$$

### 0.1.1 Coin flips

$$H(x) = -\sum_{x=1}^{\infty} \frac{1}{2^x} \log \left( \frac{1}{2^x} \right) \quad (0.1.2)$$

$$-\sum_{x=1}^{\infty} \frac{1}{2^x} \log(0.5^x) = \sum_{x=1}^{\infty} \frac{x}{2^x} \log(2) \quad (0.1.3)$$

$$= \sum_{x=1}^{\infty} x 0.5^x \log(2) \quad (0.1.4)$$

$$= \left( \frac{1}{1-0.5} \right)^2 \log(2) \quad (0.1.5)$$

$$= \frac{1}{4} \log(2) = 2 \log(2) = 2 \quad (0.1.6)$$

$$(0.1.7)$$

### 0.1.2 Entropy of functions flips