

Consider a random variable X with values in

$$A_X = \{x_1, \dots, x_8\}$$

and probability mass function

$$P_X = \{1/4, 1/4, 1/4, 3/16, 1/64, 1/64, 1/64\}$$

- What is the information content of each outcome x_i ?
- What is the entropy of the distribution?
- Draw a binary probability tree for X . For each node, write the corresponding event; for each edge, write the corresponding conditional probability
- Plot the essential bit content $H_\delta(X)$ as a function of the error δ

Consider $X^{(3)} = X \times X \times X$:

- what is the entropy of $X^{(3)}$?
- Plot $H_\delta(X^{(3)})$ as a function of δ
- How many binary strings we need to represent $X^{(3)}$ if we allow an error of 1%?