Entropy

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Video link

Uncertainty

- uncertainty in a random variable or random quantity
- information gained by learning the value of some unknown random variable
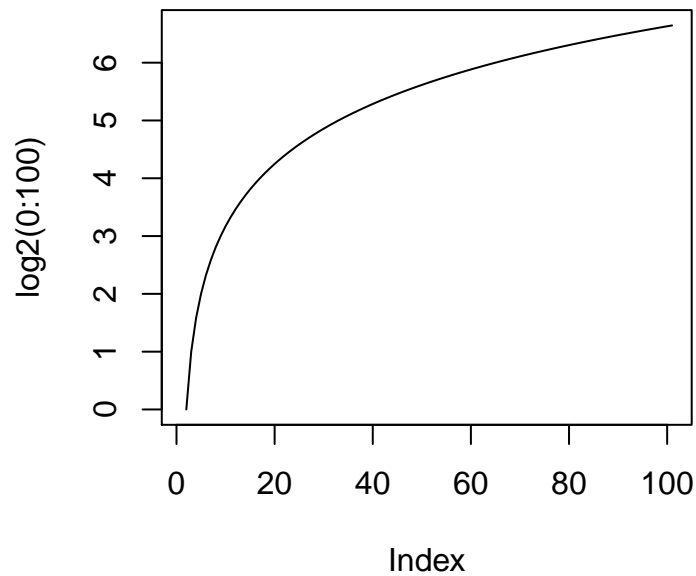
Let

$$\text{Let x be a discrete random variable } x \in X, \ X \sim P \tag{1}$$

The entropy of x is

$$H(X) = -\sum_{x \in X} P(x) \ log_2 \ P(x) \tag{2}$$

Log base 2, "bits"

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plot(log2(0:100), type = "line")
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Expectation

$$E(f(x)) = \sum_{x \in X} f(x) \ p(x) \tag{3}$$