

Information content/Entropy.

The information content, entropy, of a particular symbol, x , is calculated from the probability of its occurrence using the following formula. If $p(x) = 0$ then $H(x) = 0$ by definition.

$$H(x) = -\log p(x) \cdot p(x)$$

Remember that all probabilities must obey the following rule.

$$0 \leq p(x) \leq 1$$

When $p(x) = 1$, $-\log p(x) = 0$. Otherwise $\log p(x) < 0$ and $-\log p(x) > 0$.

If a code X consists of n symbols, x_1, \dots, x_n , then

$$H(X) = -\sum_{i=1}^n p(x_i) \log p(x_i)$$