

# The information contained in uniform distributions



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- Explain the meaning of the term functional
  - State Khitchines four axioms for the information
  - Explain what we mean when we state that a function or functional is monotonically decreasing.
  - Now explain why the information in a uniform distribution decreases monotonically with the size of the sample space.

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- If the uniform probability distribution  $p$  has a sample space with  $m$  outcomes and the probability distribution  $q$  has a sample space with  $n$  outcomes. How many outcomes are there in the sample space for the joint probability distribution  $p \otimes q$ . N.B.  $p$  and  $q$  are independent.
- Explain why the information in a uniform probability distribution must be a function of  $\frac{1}{n}$  where  $n$  is the number of
- Hence, explain why the information in a uniform distribution,  $p$ , is given by:  $I(p) = -k \ln n$ .