

 $\bullet$  How are the entropy and the information related

• Fill in the blank in the following sentence: The uniform distribution has ... entropy.

• Give an expression for the entropy if the distribution is uniform and define all terms.

• Give an expression for  $\log P_j$  given that  $P_j = \frac{e^{-\sum_k \lambda_k B_j^{(k)}}}{e^{\Phi}}$ .

## Entropy in statistical mechanics

• Hence, show that:  $S = k_B \sum_i P_i \sum_k \lambda_k B_i^{(k)} + k_B \sum_i P_i \Psi$  to do this you will need to note how entropy, S, and information are related and to remember the formula that gives you the information contained in a distribution.

• What is  $\sum_{i} P_{i}$  equal to

• What is  $\sum_{i} P_{i} B_{i}^{(k)}$  equal to

• Give an expression for the entropy for a generalised distribution and explain how the results above are used in the derivation of this result.