



MathsNET

A joined up approach to
teaching and learning
mathematics

Entropy in statistical mechanics

- 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.