

1 Boltzmann probabilities

Consider a three-state system with energies $(-\epsilon, 0, \epsilon)$.

- (a) At infinite temperature, what are the probabilities of the three states being occupied? What is the internal energy U ? What is the entropy S ?
- (b) At very low temperature, what are the three probabilities?
- (c) What are the three probabilities at zero temperature? What is the internal energy U ? What is the entropy S ?
- (d) What happens to the probabilities if you allow the temperature to be negative?