Summary Introduction Statistical Thermodynamics

Statistics

Class #1 22/09/20

Concepts

Random variable: Is a variable whose value depends of a aleatory event,(Eg. throw a dice or a coin.)

Exist two class of random variables **discrete** and **continuous** :

- **Discrete:** Are an array of finite values.
- **Continuous:** Are an array of infinite values.

Discrete variables

Throw a dice is an example of aleatory event, and the array of discrete values is [1,2,3,4,5,6], if we want to know which are the probability to get the value 5 when throw the dice once, by our logic know that the probability is $\frac{1}{6}$, and this is true, but the reason behind of this is explain

So we can call S to the array of the discrete values (*communly called "sample space"*), and n the number of possibles values that S can be.

$$S = [s_i, s_{i+1}, s_{i+2}...s_n] \tag{1}$$

The same way we can define the array of probabilities for each values.

$$P = [p_i, sp_{i+1}, p_{i+2}...p_n] \tag{2}$$

Example: for a coin $S = [sideA, sideB]$ by logic we know that the probability to get the $sideA$ or $sideB$ must be $\frac{1}{2}$ this is because have two available values for the coin, we normalization the probability to 1, like this:

$$\sum_{i=1}^{n} p_i = 1 \tag{3}$$

For a coin the probability must be 1 this is

$$p_{coin} = p_1 + p_2 = \frac{1}{2} + \frac{1}{2} = 1$$

This tell us and explaint why the probability for each event is $\frac{1}{2}$ and in the dice case is analogous.

$$p_{dice} = p_1 + p_2 + ... + p_6 = \frac{1}{6} + \frac{1}{6} + ... + \frac{1}{6} = 1$$

Permutations

This are the number of possibilities for a array of

NAME OF CHAPTER

Class #NUMBER OF CLASS DATE DD/MM/YY

Topic X

Lorem Ipsum has been the industry's standard dummy text ever since the 1500s, when an unknown printer took a galley of type and scrambled it to make a type specimen book. It has survived not only five centuries, but also now you can seee text with colot **bold text** *italic text* <u>underline text</u>