

Task0:

You have a wall made of a metallic material inside a room. The temperature distribution across this wall is influenced by various factors, including its thermal conductivity, thickness, and heat generation.

The wall is represented as a two-dimensional matrix, where each cell corresponds to a specific location on the wall. Your task is to create a Python program that visualizes the temperature distribution across the wall based on the following parameters:

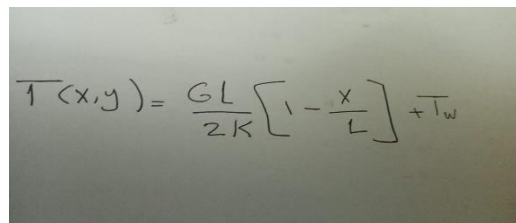
The thermal conductivity of the wall material is represented by the coefficient K .

The thickness of the wall is represented by L .

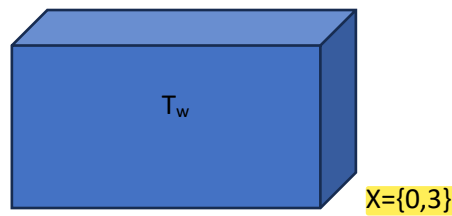
The heat generation rate within the wall is denoted by G .

The heat at both surfaces of the wall is represented by T_w .

to calculate the temperature in each point by the following


$$T(x,y) = \frac{GL}{2K} \left[1 - \frac{x}{L} \right] + T_w$$

Use Python to create a graphical representation that shows the temperature distribution across the wall by 3D view



Task1:

What is the probability that half the product of three dice will exceed their sum?

Task2:

Suppose you have a bag of 5 red marbles and 3 green marbles. You draw two marbles from the bag without replacement (meaning you don't put the marbles back after drawing). Calculate the following probabilities:

1. What is the probability that the first marble drawn is red and the second marble drawn is also red?
2. Given that the first marble drawn is green, what is the probability that the second marble drawn is red?
3. Given that the first marble drawn is red, what is the probability that the second marble drawn is green?

Task 3:

Calculate the conditional expectation of the sum of two dice rolls, given that the first die shows an even number. We'll consider both dice as fair six-sided dice

Task 4:

You are given a dataset representing the heights of students in a class. Implement the following using Python:

- Calculate the mean, median, and mode of the dataset.

- Plot a histogram to visualize the distribution of heights.

- Calculate the standard deviation and variance of the heights.

- Check if the height data follows a Gaussian (normal) distribution

Task5:

A professor is testing the effectiveness of a new study technique on student exam scores. The professor believes that students who use the new technique will perform better on the exam compared to those who do not use it. The professor selects two groups of students: Group A, who use the new technique, and Group B, who do not use it. The professor administers an exam to both groups and wants to determine if there is a significant difference in the mean exam scores between the two groups.

Group A Scores: [85, 90, 88, 92, 78, 95, 89, 91, 82, 87]

Group B Scores: [78, 82, 80, 85, 76, 88, 84, 89, 83, 79]