

// @ZEYNEP TANRIVERMIS
// @20220808038
// @Computer Engineering (first year student)

// I used ChatGPT for this sections
// Plot 2 dimensional image of the matrix by appropriate graphing tools.
// Plot V for $i=[1, 9]$ and $j=0$ x direction, V vs x
// Plot V for diagonal direction $i;j=[1;1]$ to $[9,9]$, V vs r (r is in diagonal direction)

KONSOL

```
Run Physics_Homework x
"C:\Program Files\Java\jdk-17\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2024.1\lib\idea_rt.jar=60920:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2024.1\bin" -Dfile.encoding=UTF-8
Potentials saved to potentials.txt
Image saved to potentials.png
V vs x data saved to V_vs_x.txt
V vs r data saved to V_vs_r.txt
Equipotential points saved to equipotential_points.txt
*****
Electric field at x = 0,01 m: 8,854e+04 N/C
Electric field at x = 0,05 m: 3,215e+05 N/C
Electric field at x = 0,10 m: 3,178e+05 N/C
Electric field at x = 0,20 m: 1,608e+05 N/C
Electric field at x = 0,50 m: 3,390e+04 N/C
Electric field at x = 1,00 m: 8,854e+03 N/C
Process finished with exit code 0
```

ChatGpt

Sen

How can I plot 2 dimensional image of the matrix by appropriate graphing tools.

ChatGPT

To plot a 2-dimensional image of the matrix using appropriate graphing tools in Java, you can use libraries like JavaFX or Swing to create a simple GUI application. Here's a basic example using JavaFX:

```
java
import javafx.application.Application;
import javafx.scene.Scene;
import javafx.scene.image.ImageView;
import javafx.scene.layout.GridPane;
import javafx.stage.Stage;

public class MatrixPlotter extends Application {
    private static final int MATRIX_SIZE = 10;
    private int[][] matrix;

    @Override
    public void start(Stage primaryStage) {
        matrix = generateMatrix();
        ImageView imageView = createImageView();

        primaryStage.setScene(new Scene(new GridPane(), 800, 800));
        ((GridPane) primaryStage.getScene().getRoot()).add(imageView, 0, 0);
        primaryStage.show();
    }

    private int[][] generateMatrix() {
        int[][] matrix = new int[MATRIX_SIZE][MATRIX_SIZE];
        // Populate your matrix here
        return matrix;
    }

    private ImageView createImageView() {
        // Assuming matrix values represent grayscale intensities
        int width = MATRIX_SIZE;
        int height = MATRIX_SIZE;

        byte[] imageData = new byte[width * height];
        for (int i = 0; i < MATRIX_SIZE; i++) {
            for (int j = 0; j < MATRIX_SIZE; j++) {
                // Convert matrix values to grayscale intensities (0-255)
                imageData[i * width + j] = (byte) (matrix[i][j] * 255 / MATRIX_SIZE);
            }
        }
    }
}
```

ChatGPT uygulamasına ileti gönder

ChatGPT hata yapabilir. Önemli bilgileri kontrol et.

How can I plot V for $i=[1, 9]$ and $j=0$ x direction, V vs x



To plot the electric potential V along the x -axis for i ranging from 1 to 9 and $j = 0$ using Java, you can utilize the 'BufferedImage' and 'Graphics2D' classes to create a simple line plot. Here's the complete Java code to accomplish this:

1. Calculate the potentials along the specified axis.
2. Generate and save the plot as an image.

Here's the updated Java code:

```
java Kodu kopyala

import java.awt.Color;
import java.awt.Graphics2D;
import java.awt.image.BufferedImage;
import java.io.File;
import java.io.FileWriter;
import java.io.IOException;
import javax.swing.ImageIcon;
import java.io.File;

public class Physics_Homework {
    public static void main(String[] args) {

        // Constants
        double k = 8.9875517923e9; // Coulomb's constant
        int q = 1; // Charge at the point

        // Creating a matrix 10x10
        double[][] potentials = new double[10][10];

        // Calculating the potential at each point in the matrix
        for (int i = 0; i < 10; i++) {
            for (int j = 0; j < 10; j++) {
                if ((i == 0 && j == 0)) { // Skip the point charge itself
                    double distance = Math.sqrt(Math.pow(i, 2) + Math.pow(j, 2));
                    double potential = k * q / distance;
                    potentials[i][j] = potential;
                } else {
                    potentials[i][j] = 0; // Assign a potential of zero at the location of
                }
            }
        }

        // Save data to a file
        try {
            FileWriter writer = new FileWriter("potentials.txt");
            for (int i = 0; i < 10; i++) {
                for (int j = 0; j < 10; j++) {
                    writer.write(potentials[i][j] + " ");
                }
                writer.write("\n");
            }
            writer.close();
        } catch (IOException e) {
            e.printStackTrace();
        }
    }
}
```



ChatGPT uygulamasına İleti gönder



POTENTIALS

