PH 366 Day 7: Superposition and Electric Potential

29 Jan 2025

Announcements

Midterm mini-project next week

- 20% of your final grade
- Detailed description and grading rubric on Canvas
- We'll work on it during both classes next week
- Focused on more recent material (Days 5-7)

Calculating Electric Potential Anywhere (...on 1D x-axis)

Electric potential calculated at value(s) of `x`, from any `charges` with any `positions`

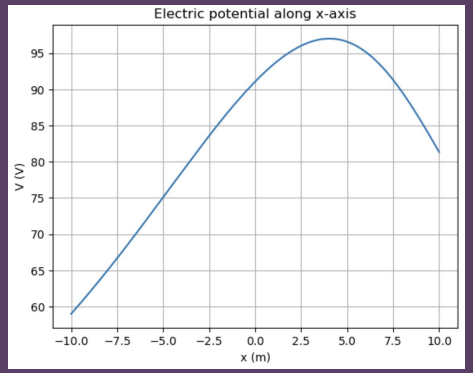
```
def Vx(x, charges, positions):
    potential = 0
    for i in range(len(charges)):
        qi = charges[i]
        rix = positions[i][0]
        riy = positions[i][1]
        riz = positions[i][2]
        potential += k * qi / ((x - rix) ** 2 + riy ** 2 + riz ** 2) ** (1/2)
    return potential
```

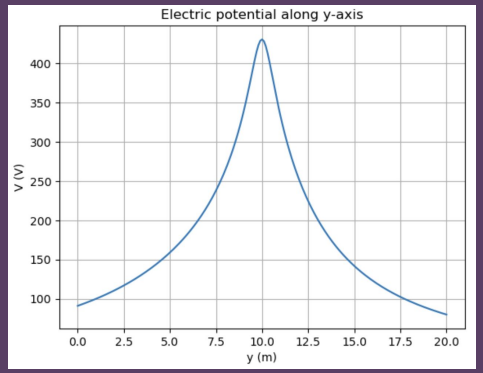
Loop through all the point charges one by one, each with its own charge `qi` and position (`rix`, `riy`, `riz`)

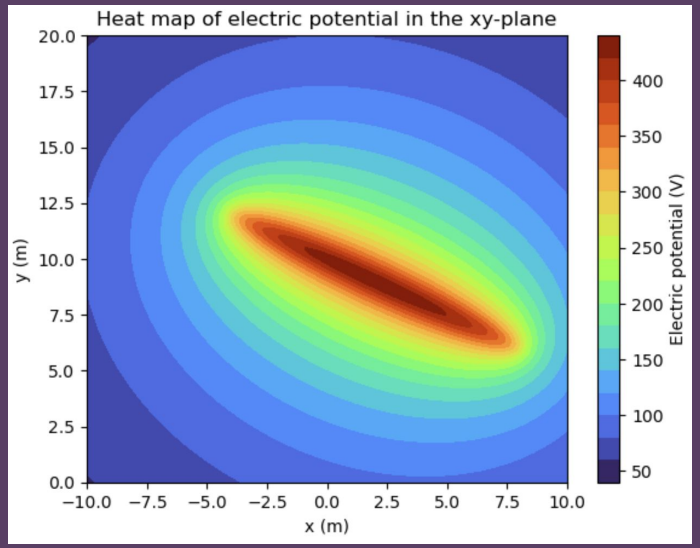
Add each point charge's contribution to the total electric potential being measured at x

$$V_x(x) = \sum_i \frac{kq_i}{\sqrt{(x - r_{i,x})^2 + r_{i,y}^2 + r_{i,z}^2}}$$

Plotting Electric Potential in 1D vs 2D







Today’s Assignment

Building from 1D, work towards **calculating** and **plotting** electric potential across an entire 2D area

Reminder

Try using **generative AI** tools when prompted in the assignment

Write down how you used it to help us design better ways to help you learn computing