Experiment 2 Plotting the Electric Field Using Equipotentials

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We used a phet to simulate two different situations and drew them and their electrostatic lines at specific points. We then drew a couple E-field lines on the graph paper by using the electrostatic lines. We measured the e-potential at a specific point during the first situation and compared that to a calculated value for the e-field at that point. The measured value ended up as -2.38 and the calculated value ended up as -2.28 which resulted to a %error of 4.19%.

Results

State here a comparison of the measured electric potential and the calculated electric potential from part 1, stating how well they compare using the percent error found. State the magnitude and direction of the electric field found in part 1.

The measured value ended up as -2.377 and the calculated value ended up as -2.277476286 which means they ended up with a relatively small percent error of 4.186946332%. The magnitude ended up as 2.765026817 at an angle of 236.8806131˚.

Questions for Discussion

1. In part 2, how are the electric field lines between the two lines of charge oriented with respect to each other near the “origin”? What happens to the electric field lines between the two lines of charge, but near the ends of the lines of charge?

The e-field lines near the origin are straight, but they begin to curve as they approach the ends of the lines of charge

1. Using the simulator you saw that the equipotential lines did not cross each other. Is it possible for equipotential lines to cross each other? Explain your answer.

It is not possible because, the value for the lines are constant so for example, a line at 50 will always be closer to a positive charge then a line at 5 because 50 is always larger than 5

1. A 10 centimeter diameter solid sphere made of a conducting material has 10 micro-Coulombs of charged placed upon it. What is the potential difference between a point on one side of the sphere to a point on the exact opposite side of the sphere? What is the magnitude of the electric field at the center of the sphere?

V=kq/r=9\*10^9\*10\*10^-6/0.1=9\*105V  
There is no electric field inside the sphere

1. Describe how the lines of electric field are oriented with respect to each other for a region having a uniform electric field. What electric circuit device generates a uniform electric field?

The e-field of such a region would be similar to the e-field from part 2, straight lines across but they begin to curve as they approach the end of the region. A capacitor generates such an electric field.