

Laboratory 1

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EXERCISE 1 (5 POINTS)

Write a Matlab function, `coulomb()`, that calculates the electric field in free space for any given charge. Next plot the electric field for a charge of $3 \mu C$ as a function of distance R from this charge using this function.

EXERCISE 2 (5 POINTS)

Using Matlab write a function, `vectorMAG()` that calculates the magnitude of a vector for 1D, 2D, and 3D dimensional vectors in Cartesian coordinate systems. Assume that the vector can be a column or row vector.

EXERCISE 3 (5 POINTS)

Use MATLAB to write a function `vecPlot3D` that, for an input 3-D vector given by coordinates of its starting and ending points, plots the vector in a 3-D Cartesian coordinate system. Other input parameters are: information whether or not scaling is to be performed and the color of the vector.

Hint: Use the MATLAB `quiver3` function.

EXERCISE 4 (5 POINTS)

Write a program in MATLAB that uses functions from MATLAB Exercises 2-3 and calculates and plots the electric force on a point charge due to N other point charges in free space. The input to the program consists of N , coordinates of charge points, and charges Q_1, Q_2, \dots, Q_N , as well as coordinates and charge of the point charge on which the force is evaluated.