Project 10 - Part A - Laplace's Equation in 1-D

In the project you will look at another boundary value problem. Consider a 5 meter region of 1-D space with no charge. Your mission, if you choose to accept it (you don't have much choice), is to determine the electric potential as a function of x, subject to the following boundary conditions.

Boundary Condition: The voltage at the left end (x=0m) = 10V and the voltage at the other end is 0V.

For a region in space with no charge: $\nabla^2 V = 0$

1. Use the method of relaxation as described in Griffith's Introduction to Electrodynamics to solve for V(x) in this region. On Wednesday, we will consider a multi-dimensional case. Use 50 points and graph your V(x) using Excel.

2. Determine V(x) using the matrix approach discussed in class. Place this solution and the *relaxed* solution on the same graph and compare.

Place cpp and xls files into the P10 dropbox.