Assignment 1 for EC301

9th January 2007

V = 0



Consider the same problem done in class, of a square box in which we wish to solve for the potential. Let $L_x = 1$ and $L_y = 2$ metres. Also, let the voltage be zero on the x = 0 wall and the y = 2 wall. On the x = 2 wall, the voltage is $0.01 \times$ (last two digits of your Roll Number) volts, while on the y = 0 wall, the voltage is $\cos(\pi x)$.

- Obtain $\phi(x, y)$ using separation of variables.
- Solve for $\phi(x, y)$ using the Scilab relaxation method explained in CADLAB.
- Obtain the maximum deviation between the numerical and analytical solutions and plot \log_{10} (deviation) vs $\log_{10} (dx)$ on x axis and 0.01 * (iteration number) on y axis (3-D plot). Submit to assign1 of ec301 on the assignment website. (Submission consists of a lyx file with the derivation, results and the scilab code).

Hint for part a): Use superposition to tackle each non-zero boundary by turns. Also think of building-block functions that are zero at y=2 and nonzero at y=0.