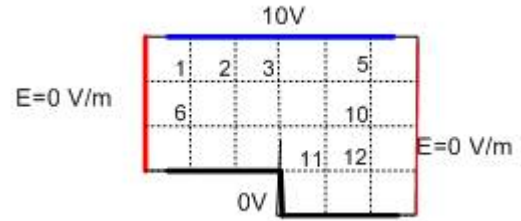


EE351
Homework # 10
Due: 11/28/07

1. Write the difference form of the Laplace equation at all nodes. Assume $h = 0.1$ micron
 - (a) Using the iterative method determine the potential at nodes 2 and 6 at the end of the iteration 2.
 - (a) Set up the matrix equation. Using the direct method determine the potential at all interior points.



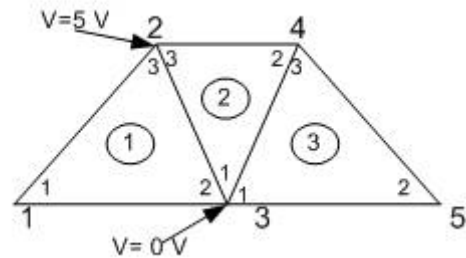
2. Solve the following system of nonlinear equations using Newton's method. As an initial guess assume $x_0 = 1, y_0 = 1$

$$x^2y - y^2 = 3$$

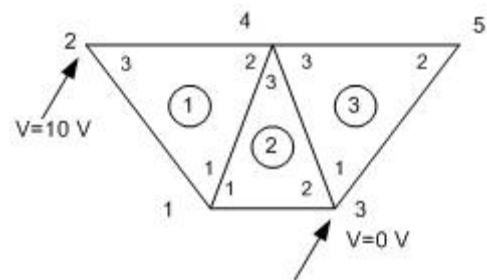
$$2xy^2 - x^3y = 12$$

- (A) Set up the Jacobian matrix
- (B) What is the value of x and y at the end iteration 2.
- (C) Write a Matlab or C code and determine the values of x and y assuming a convergence criterion $\epsilon = 0.0001$

3. If the coordinates of nodes 1 through 5 are $(1,1), (4,3), (1,4), (6,4),$ and $(1,8)$ in Figure to right. Determine the global coefficient matrix and solve for the Potentials at the nodes iteratively.



4. Determine the Global coefficient matrix for region shown in the Figure below.
 - (a) Simplify and show the reasons
 - (b) Express in terms of the element coupling terms.
 - (c) Solve for the potentials iteratively.
 Nodes 1 through 5 are at $(4,1); (1,4); (6,1); (5,4), (9,4)$



Text book: Chapter 14: problems 29, 30, 31