

Module VII:

1. Use rules of coordinate transformation to transform the two-dimensional form of the Laplace equation from Cartesian coordinates to cylindrical coordinates.
2. Write a computer program for the problem discussed in Lecture 42 and investigate the effect of grid side.
3. Repeat the problem discussed in Lecture 42 with triangular grid elements.
4. Consider a two-dimensional domain consisting of a rectangle of dimensions 100 mm x 50 mm at the centre of which a circle of 20 mm is located. The flow domain of interest is that which is external to the circle but internal to the rectangle. For this case, generate a 20 x 10 structured body-fitted grid of 20 x 10 using algebraic grid generation methods.
5. Repeat problem #2,Module VII using the elliptic grid generation method.
6. Repeat problem #2,Module VII but develop an unstructured mesh consisting of triangles using advancing front method for the triangulation.
7. Repeat problem #4,Module VII using Delaunay triangulation.
8. Extrude the grid in problem # 7,Module VII in the third dimension to get a 3-d grid.
9. Make a flow chart for the solution of the flow field for problem #8,Module VII assuming laminar flow.
10. Repeat problem #9,Module VII assuming turbulent flow.