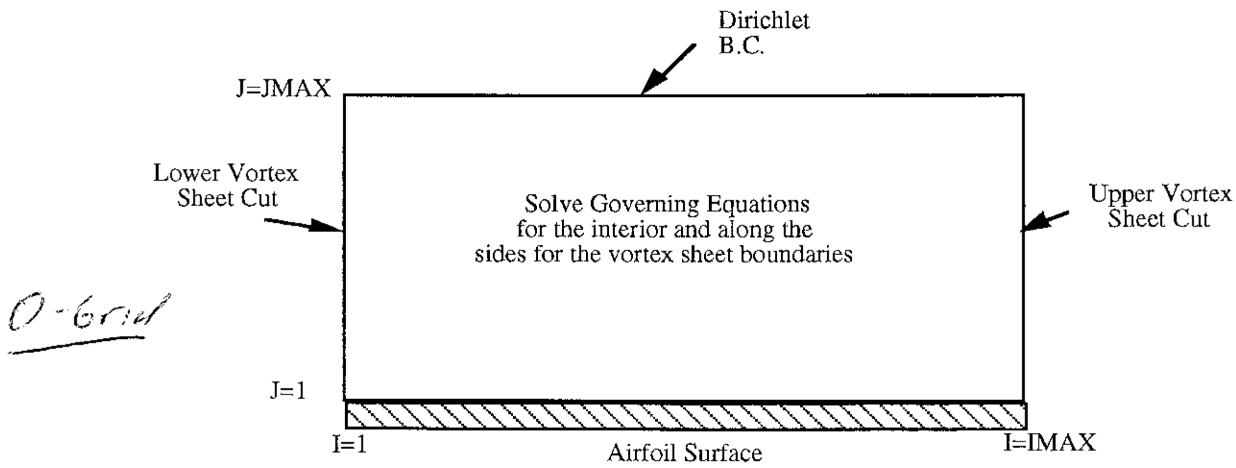
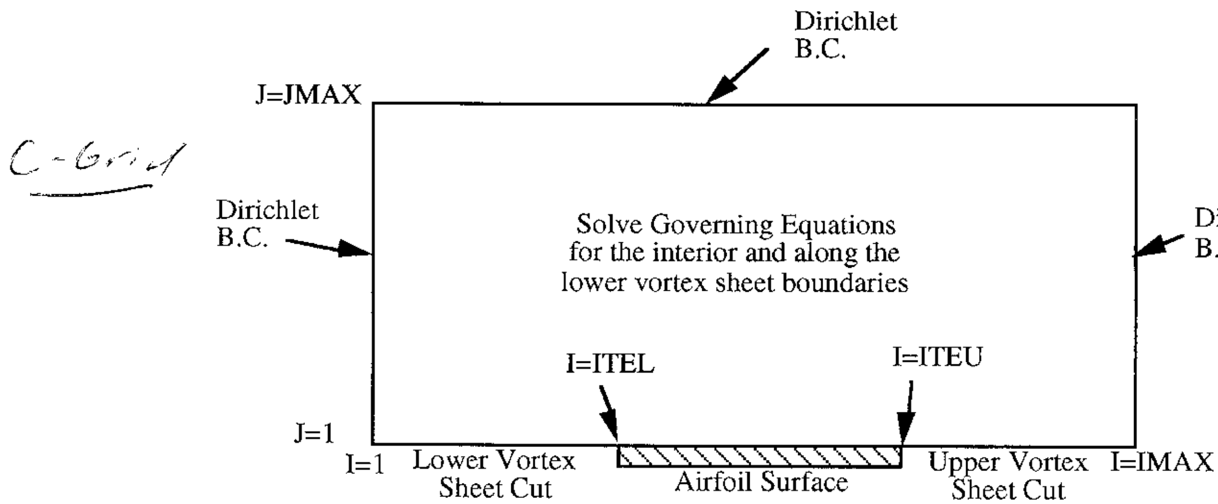
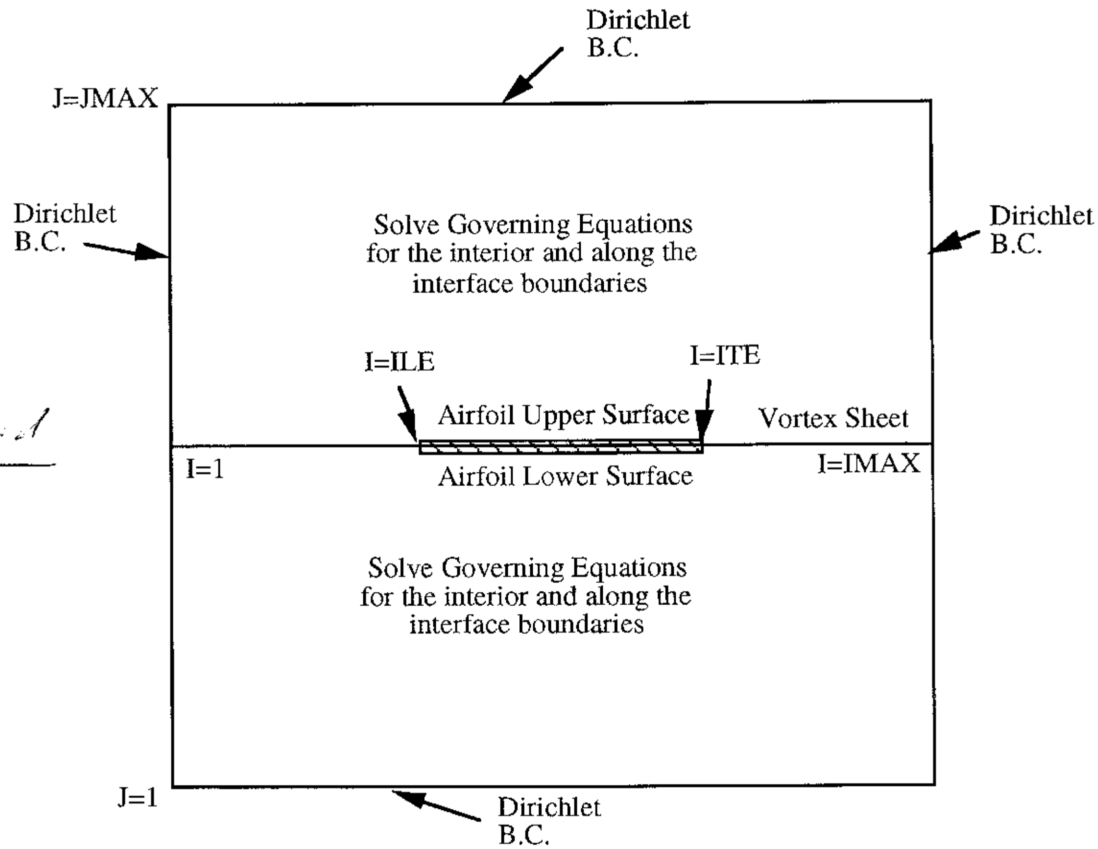


For a C-grid, the wake cut unwraps the grid so that the airfoil and wake lie along the constant ξ-line (j=1). The i=1 and i=IMAX lines (constant η-lines) are now the outflow boundaries where the Dirichlet boundary conditions are applied. The outer boundary (j=JMAX) has the Dirichlet boundary conditions applied for the upstream and lateral boundaries.



For an H-grid, the mapping can be done in two ways. The first way maps the grid similarly to the O-grid. The other method involves breaking the grid into two parts, as shown below. An ξ=constant line which breaks apart to form the upper and lower surfaces of the airfoil acts as an interface between the upper and lower airfoil sections. The solid surface and wake cut boundary conditions are applied along this ξ-line. The lateral boundaries are located at the j=1 and j=JMAX lines, while the upstream and downstream boundaries are applied at the i=1 and i=IMAX lines.



Transformation of the Governing Equation from the Cartesian Coordinate System (x,y) to the Curvilinear Coordinate System (ξ,η):

Consider the O- grid generated around an airfoil, generated using the O-Grid generator computer program distributed in the class. The O- grid lines that wrap around the airfoil may be viewed as a family of lines η= constant, while the radial lines that originate at the airfoil and end up at the far field boundary may be viewed as a family of lines ξ = constant. Then, we can assume that our physical plane (x,y) has been transformed into a computational plane (ξ,η) as shown below. Notice that this transformation is purely numerical. There is no analytical relationship linking these two planes. Also notice that each and every grid point in the physical plane maps onto a unique point in the transformed plane.