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Vortex dipole as a mechanism of shedding for inviscid methods M DEVORIA, KAMRAN MOHSENI, Univ of Florida - Gainesville — For a

ADAM DEVORIA, KAMRAN MOHSENI, Univ of Florida - Gainesville — For a sharp edge of arbitrary interior angle it is shown that the physical mechanism of vortex shedding is the existence of a vortex dipole/doublet at the edge. This is obtained by applying the limit of a point vortex approaching the shedding edge while its circulation increases. Then the vortex merges with its image to create the dipole. In the case of a finite body (doubly-connected fluid region), such as an airfoil, this dipole establishes an equivalent bound circulation round the body. However, the complex potential is not actually constructed with a dipole at the trailing edge, but that this hypothetical potential determines the strength of an equivalent bound vortex that represents the effect of the formation of vorticity to be shed. The mechanism of vortex shedding can then be interpreted as a finite portion of the infinite vorticity/circulation of the dipole being "torn apart," with the latter then regenerating with a new strength to instantaneously satisfy the regularized flow condition at the next instance of time. When done in a continuous manner, the result is a shed vortex sheet.

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