Abstract Submitted
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On the initial-value problem for the flow past a finite wing or blade JOHN RUSSELL, Fla. Inst. of Tech. — Assume piecewise irrotational motion of an incompressible fluid in which the normal velocity distribution on the wing is given and the wake is subject to continuity of normal velocity and pressure across it. The boundary integral for the velocity potential ϕ outside the wing simplifies when its inside is filled with fluid whose motion satisfies similar field equations and whose normal velocity is continuous with that outside. Calculation of $\mathbf{u} = \nabla\phi$ for the velocity transforms a superposition of dipoles to a superposition of quadrupoles and thus to integrals that diverge in the limit as the field point approaches the boundary. Integration by parts via STOKES theorem yields an integral for the velocity of BIOT-SAVART type (i.e. involving dipoles). Equations for the evolution of the vortex sheet follow from equations in §2.2 of SAFFMAN, P.G. *Vortex Dynamics*, Cambridge, 1992 and admit interpretations analogous to those of HEMHOLTZ vortex theorems but applied to vortex ribbons instead of vortex tubes.

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