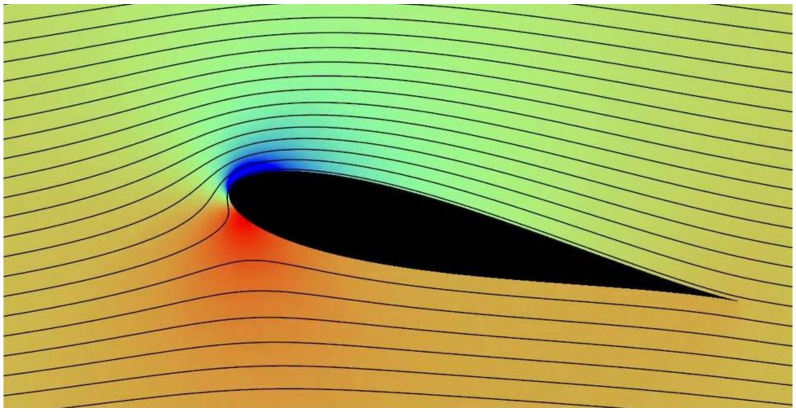
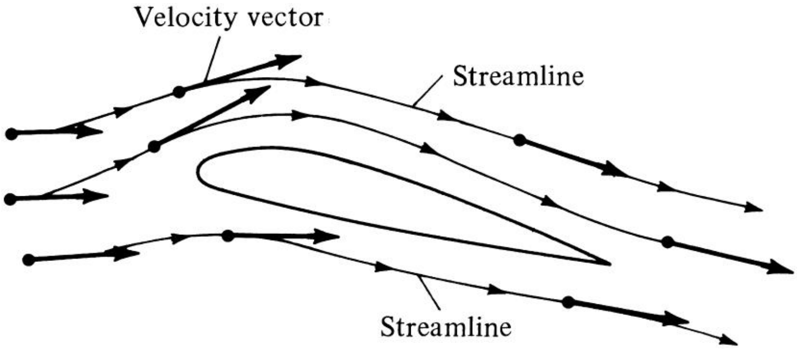
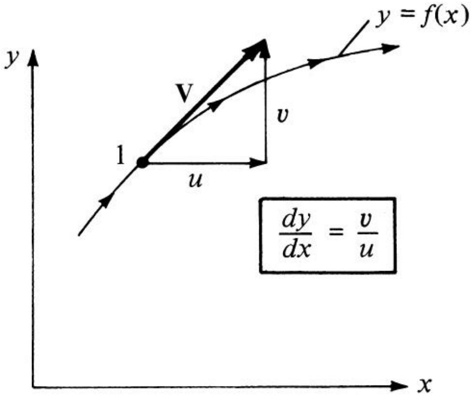
(KEY CONCEPT) [B-2-1]





Equation of streamline:

$$d\vec{s} \times \vec{V} = \vec{0}$$



For Cartesian coordinate system:

$$\frac{dz}{dy} = \frac{w}{v} \quad (y\text{-}z \text{ plane})$$

$$\frac{dz}{dx} = \frac{w}{u} \quad (x\text{-}z \text{ plane})$$

$$\frac{dy}{dx} = \frac{v}{x} \quad (x\text{-}y \text{ plane})$$

Potential flow field simulation (source: Paul Nathan, "2-D and 3-D Aerodynamics," 2025)
Streamline sketch (source: J.D. Anderson "Fundamentals of Aerodynamics" 2016)