(EXAMPLE) [B-3-1]

Uniform flow with magnitude V_∞
+ Source with magnitude Λ

$(\psi = V_\infty r \sin\theta)$ + $\left(\psi = \dfrac{\Lambda}{2\pi}\theta\right)$
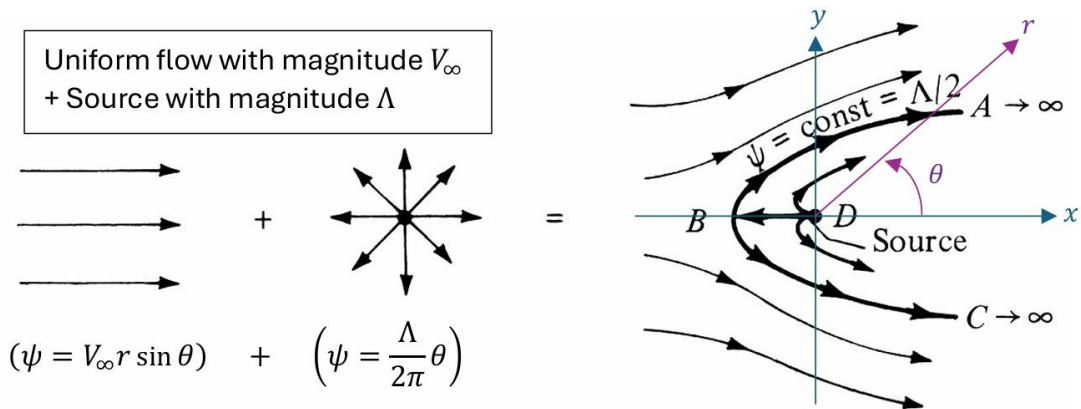
Potential flow field simulation (source: J.D. Anderson "Fundamentals of Aerodynamics" 2016)

Consider the flow field simulation by the superposition of a uniform flow (V_∞) and a source (Λ). The stagnation point of this flow (flow around a half-Rankine body) is:

$$(r,\theta) = \left(\frac{\Lambda}{2\pi V_\infty}, \pi\right) = (R,\pi)$$

Determine the "shape" of the body surface (r/R) and the pressure coefficient (C_p) for the given range of the angular positions (θ).

θ (degrees)	θ (radians)	r/R	R/r	C_p
30	0.5236			
45	0.7854			
90	1.5708			
135	2.3562			
150	2.6180			
180	3.1416			