Recap: Stream fct and Velocity Potential

Stream fct: $v_x = \frac{\partial \psi}{\partial y}$, $v_y = -\frac{\partial \psi}{\partial x}$

Velocity Potential: $\vec{v} = \vec{\nabla} \phi$ (3D)

in 2D: $v_x = \frac{\partial \phi}{\partial x}$, $v_y = \frac{\partial \phi}{\partial y}$

Cauchy Riemann: $\frac{\partial \psi}{\partial y} = \frac{\partial \phi}{\partial x}$; $-\frac{\partial \psi}{\partial x} = \frac{\partial \phi}{\partial y}$

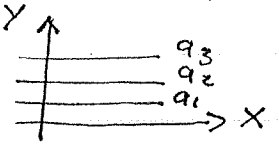
Complex Potential: $\Omega(z) = \phi(x,y) + i\,\psi(x,y)$

with: $z = x + iy$

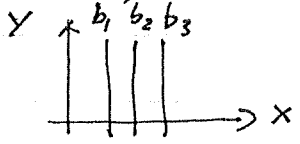
Irrotational flow / Potential flow: $\nabla^2 \psi = 0$ and $\nabla^2 \phi = 0$

and Bernoulli: $\frac{v_1^2 - v_2^2}{2} + \frac{p_1 - p_2}{\rho} = 0$

Streamlines: $\psi = \text{const}$; Ex: $\psi_i = u_y = a_i$ (a_i..const)



Equipotential lines: $\phi(x,y) = \text{const.}$; Ex: $\phi_i = u_x = b_i$



Complex Velocity: $\frac{d\Omega}{dz} = v_x - i\,v_y$

Stagnation Point: $\frac{d\Omega}{dz} = 0$