Homework #3 **MEAM 5450 - Fall 2022**
Assigned: 10/10/2022, Due: 10/16/2022

Fun assignment time!

You are an intern at a startup and have been given an opportunity to work with the Aerodynamics team. The team is hard at work analyzing and testing a few new airfoil designs. You want to contribute to the discussion and impress your technical lead engineer, so to refresh your knowledge you have decided to try to analyze a few shapes using potential flow theory. To keep things simple you use only basic flow solutions (uniform, source/sink and doublets). Your plan is to see if you can generate a potential flow solution around a square, triangle and an oval.

$V_r = V_\infty \cos\theta$
$V_\theta = -V_\infty \sin\theta$

Uniform flow

$V_r = \frac{\lambda}{2\pi r}$
$V_\theta = 0$

Source/Sink

$\psi = -\frac{\kappa}{2\pi}\frac{\sin\theta}{r}$
$V_r = \frac{1}{r}\frac{\partial\psi}{\partial\theta}$
$V_\theta = -\frac{\partial\psi}{\partial r}$

Doublet