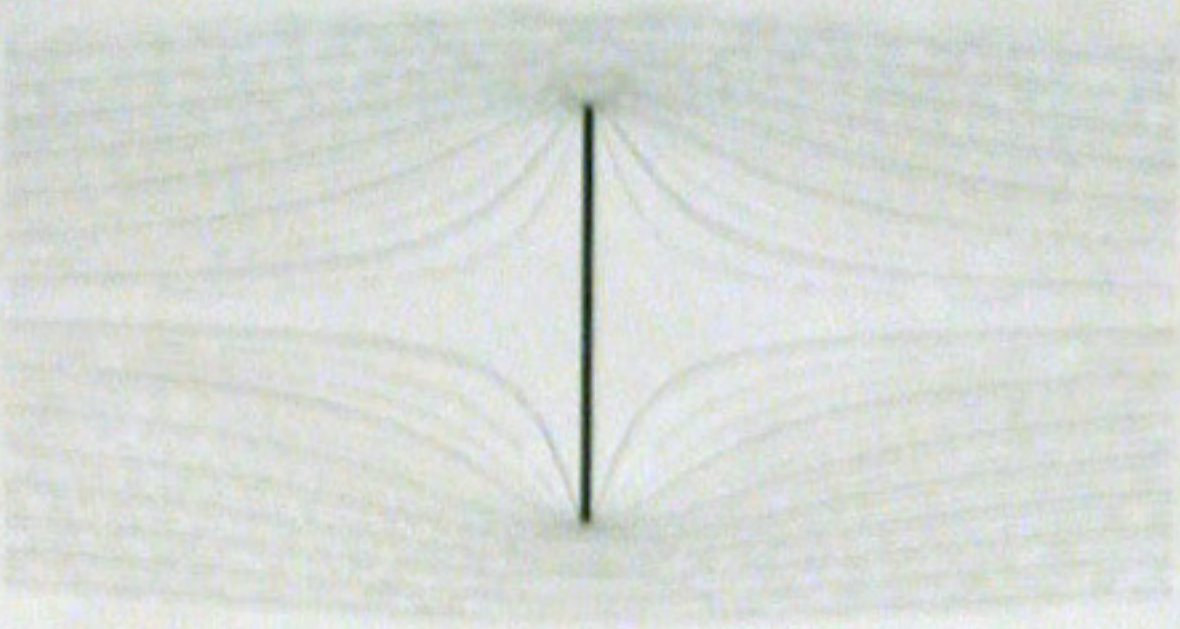
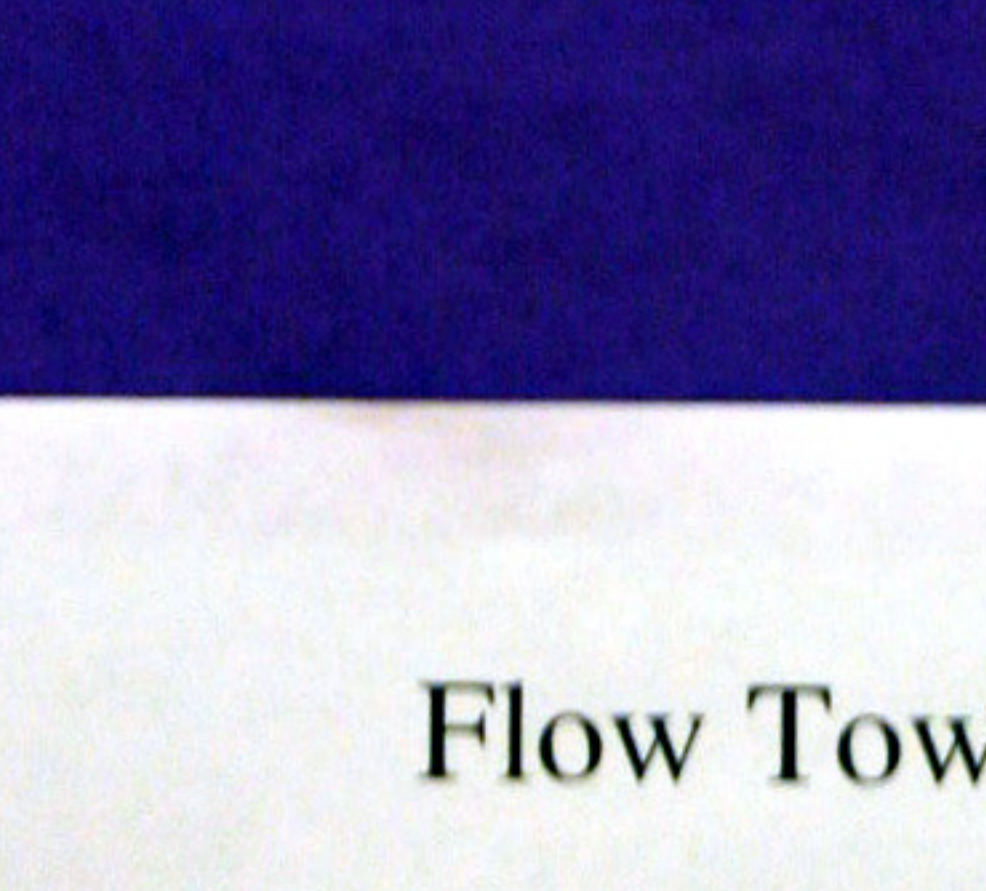
Fluid Flow around a Wall



$$f[k\_, x\_] := k\sqrt{\frac{1 + k^2 + x^2}{k^2 + x^2}}$$

The figure below depicts the complex potential for an ideal fluid flowing from left to right, parallel to x, across the complex plane. A wall stretches from from $-i$ to i. Using conformal mapping, $S(z)=(z+i)^{1/2}(z-i)^{1/2}$, streamlines can be parameterized and solved to obtain the above equation. Thus, points can be plotted as k is varied for each streamline in the domain.

Flow Towards a Wall



$$f[k\_, x\_] := \frac{k}{4x}$$

The complex potential $F(z)=A/2*z^2$ is depicted below, where $A=4$, and is always positive, in this case. The velocity potential, $\varphi(x,y)=A/2*(x^2-y^2)$, and stream function, $\psi(x,y)=Axy$, forms a family of hyperbolas with asymptotes along both axes. The fluid flows downwards along the streamlines as if parallel to the iy axis and spreads out against a wall, the x axis.