Consider a body moving in an ideal fluid in a closed, frictionless container.

Net force downstream:

$$ F_{ds} = \int_{S_1} p_1 dS_1 - \int_{S_2} p_2 dS_2 - D $$

but this must be equal to difference in momentum fluxes thru bounding surfaces

$$ F_{ds} = \int_{S_2} \rho u_2^2 dS_2 - \int_{S_1} \rho u_1^2 dS_1 $$
\[ \int P_1 \, ds_1 - \int P_2 \, ds_2 = \int s_0 u_2^2 \, ds_2 - \int s_0 u_1^2 \, ds_1 \]

- \[ D = \int (P_1 + \rho u_2^2) \, ds_2 - \int (P_1 + \rho u_1^2) \, ds_1 \]
- \[ D = \int ds_2 \, \Pi_{22} \bigg|_1 - \int ds_1 \, \Pi_{22} \bigg|_1 \]
- \[ \Pi = \rho \mu u_{11} + \delta_{ij} P \]
- \[ \Phi(\nabla v) = -\partial_i \Pi_{ij} \quad \text{(motion along} \ \zeta) \]

Now, in ideal fluid:

\[ \frac{V}{V} = \frac{1}{V_{\text{fluid}}} \]

\[ V_{\text{fluid}} = \frac{1}{r^2} \rightarrow \text{dipole} \]
So, if take $2 \to \infty$ move boundary to $\infty$.

$$\Pi_{22} = \rho U^2 + P_0$$ both attached wake

- E.g. asymptotically $\Pi_{22} \to \rho U^2 + P_0$
- (no far field remnant of motion)

So

$$D = 0 \frac{1}{2}$$

$\rightarrow$ No drag on body in ideal fluid

$\rightarrow$ Convergence of asymptotic behavior of flow and wake
  i.e. attached wake.

$\rightarrow$ Exception: body near surface radiates.