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NAME

Fluids-ID

Quiz 12. A prototype ship is 35 m long and designed to cruise at 11 m/s. Its drag force is to be estimated by a 1 m long model ship pulled in a tow tank. (a) Find the speed of model to satisfy Froude number similarity, (b) Estimate the ratio of drag force, $D_{model}/D_{prototype}$, by using drag coefficient similarity.

$$\text{Froude number, } Fr = V/\sqrt{gL}$$

$$\text{Drag coefficient, } C_D = \frac{D}{\frac{1}{2}\rho V^2 L^2}$$

where L is the length of ship, D is the drag force and V is the speed of ship.