



Physics 1: Series 1

Dimensional equations

Exercise 1

Write the dimensional equations of the following quantities and deduce their units in the international system (IS):

1. The pressure $P = \frac{F}{S}$
2. The quantity of movement $\vec{P}: \left(\vec{F} = \frac{d\vec{P}}{dt} \right)$
3. The momentum of $\vec{F} : \vec{\mathcal{M}}_{/O}(\vec{F}) = \vec{r} \wedge \vec{F}$
4. The angular momentum $\vec{\mathcal{L}} = \vec{r} \wedge \vec{P}$
5. The electric field $E = F/q$
6. The electric potential $V = E \cdot l$

Exercise 2

Experience has shown that the force experienced by a sphere immersed in a moving fluid depends on:

- The viscosity coefficient η of the fluid.
- The radius of the sphere R .
- Their relative speed v .

Find the expression for this force by assuming the form: $F = k\eta^a R^b v^c$
(k is a dimensionless numerical coefficient). We recall that $[\eta] = L^{-1}MT^{-1}$.