

Dimensional Analysis

Physics

Checking an equation before trusting the number it gives.

Both sides of any physical equation must have identical dimensions.

$$[\text{Force}] = \text{MLT}^{-2} \cdot [\text{Energy}] = \text{ML}^2\text{T}^{-2}$$

$$v = u + at$$

Consistent.

$$\text{LT}^{-1} = \text{LT}^{-1} + \text{LT}^{-2} \cdot \text{T}$$

$$\text{Check } E = \frac{1}{2}mv^2$$

$$\text{ML}^2\text{T}^{-2} \text{ both sides}$$

Deriving a form

Fixes exponents, not constants

THE COMMON MISTAKE

✗ **Treating a dimensional check as proof**

✓ **It can only disprove**

Dimensionless constants like $\frac{1}{2}$ or 2π are invisible to the check. A correct dimension does not guarantee a correct equation.

Arguments of sin, log and exp must be dimensionless. That is a fast check people frequently forget.