On the use of Dimensional Equations.

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[*Abstract.*]

The second law of motion may be expressed as a dimensional equation in the form

$$f = m\frac{l}{t^2} \qquad \dots \qquad \dots \qquad \dots \qquad (1),$$

where the meanings of the quantities are obvious.

If we cut out the factor m from each side, we may write this in the usual form,

$$\ddot{x} = a\frac{x}{t^2} \qquad \dots \qquad \dots \qquad \dots \qquad (2).$$

The general solution is

$$x = \mathrm{A}t^n + \mathrm{B}t^{-m},$$

where $$m(m+1) = n(n-1).$$

Taking one term only, we get

$$\ddot{x} = n(n-1)\mathrm{A}t^{n-2} = n(n-1)\mathrm{A}^{\frac{2}{n}}x^{\frac{n-2}{n}} \qquad \dots \qquad \dots \qquad (3),$$

so that the limited problem corresponds to powers of the distance as the law of acceleration.

We then have in (2) $a = n(n-1)$, and so, when the law of force is given in terms of the distance, we can use (2) and (3) to get an expression for t.

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