Feynman and Trimmer

Note Title 1/15/2014

Who was Feynman? Physicist at Caltech
Feynman diagrams
Nobel Prize
Challenger investigation

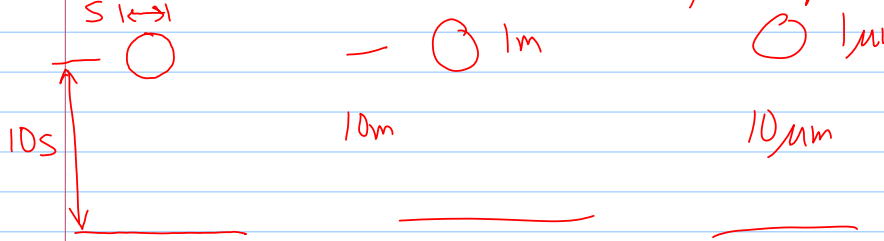
Data Storage, miniaturization

Trimmer Discussion
Methodology for determining how forces scale WRT to spatial size.

Defines a notation where 's' represents some length scale of a physical system. Then he postulates that we have quantities that scale with different powers of s.

$s^F \Rightarrow F \propto \begin{bmatrix} s^1 \\ s^2 \\ s^3 \\ s^4 \end{bmatrix}$ ← surface tension; ← pressure, drag, electrostatics; ← weight, inertia; ← magnetic, nuclear

How does the acceleration of an object depend on s?



Newton's 2nd Law

$F = ma \Rightarrow \left(F = \frac{dp}{dt}\right)$

$a = \frac{F}{m} = [s^F][s^{-3}] = \begin{bmatrix} s^{-2} \\ s^{-1} \\ s^0 \\ s^1 \end{bmatrix}$

How does time scale? $a \equiv \frac{d^2x}{dt^2} = \frac{F}{m}$

$x_0 = 0 \quad v_0 = 0$

init pos = 0 ; init vel = 0 $\quad x = \frac{1}{2}\frac{F}{m}t^2 + \cancel{v_0 t} + \cancel{x_0}$

solve for time $\Rightarrow \quad t = \left(\frac{x\,2m}{F}\right)^{1/2}$

$= \left([s^1][s^3][s^{-F}]\right)^{1/2}$

$= [s^{2-F/2}]$

$t = \begin{bmatrix} s^{3/2} \\ s^1 \\ s^{1/2} \\ s^0 \end{bmatrix}$ ←