Feynman and Trimmer

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

Data Storage, miniaturization

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,

\[ S^F \Rightarrow F \propto \begin{bmatrix} S^{17} \\\ S^2 \\\ S^3 \\\ S^4 \end{bmatrix} \]
- surface tension
- pressure, drag, electrostatics
- weight, inertia
- magnetic, nuclear

How does the acceleration of an object depend on s?

<table>
<thead>
<tr>
<th>s</th>
<th>1 m</th>
<th>10 m</th>
<th>100 m</th>
</tr>
</thead>
<tbody>
<tr>
<td>10^1</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>10^2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10^3</td>
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</tbody>
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Newton's 2nd Law
\[ F = ma \Rightarrow (F = \frac{dp}{dt}) \]
\[ a = \frac{F}{m} = [S^0][S^{-3}][S^{-1}] = [S^{1}] \]

How does time scale? \[ \alpha = \frac{d^2x}{dt^2} = \frac{F}{m} \]
init pos = 0 ; init vel = 0
\[ x = \frac{1}{2} \frac{F}{m} t^2 + V_0 t + X_0 \]

Solve for time \[ t = \frac{(\frac{X_2 - X_0}{F})^{1/2}}{1/2} \]
\[ = [S^{1/2}] \]

\[ t = \begin{bmatrix} S^{1/2} \\
S^1 \\
S^{1/2} \\
S^0 \end{bmatrix} \]