# Demo: Chalkboard Math

- Keynote Blackboard Theme
- Chalkboard Font for Titles
- Tekton Informal Math Font for Math
- LaTeXiT to Create Math Content

# Work-Energy Principle

Begin by dotting both sides of Newton's second law with the infinitesimal displacement of the particle $d\vec{r}$

$$\vec{F} \cdot d\vec{r} = m\vec{a} \cdot d\vec{r}.$$

We now apply the identities $d\vec{r} = \vec{v}\,dt$ and $\vec{a} = d\vec{v}/dt$ to the right-hand side to obtain

$$\begin{aligned} \vec{F} \cdot d\vec{r} &= m\frac{d\vec{v}}{dt} \cdot \vec{v}\,dt, \\ &= m\vec{v} \cdot d\vec{v}. \end{aligned}$$

# W-E Principle (cont.)

It is straightforward to show that the differential of $\frac{1}{2}m\vec{v}\cdot\vec{v}$ is equal to the right-hand-side of our previous result, that is,

$$\begin{aligned} d\left(\tfrac{1}{2}m\vec{v}\cdot\vec{v}\right) &= \tfrac{1}{2}m\left(d\vec{v}\cdot\vec{v}+\vec{v}\cdot d\vec{v}\right), \\ &= \tfrac{1}{2}m\left(2\vec{v}\cdot d\vec{v}\right), \\ &= m\vec{v}\cdot d\vec{v}, \end{aligned}$$

where $d(\,)$ indicates the differential of the quantity in parentheses.

# Credits

Slides 2 & 3 were prepared by Gary Gray
and use the
Keynote Blackboard Theme
and Tekton Informal Math Font.

LaTeXiT was used to generate the math content
See the discussion on the
"Hand-Writing Style Mathematical Formula for Keynote Blackboard Theme? "
in the Mac OS X TeX archives
<http://tug.org/pipermail/macostex-archives/>