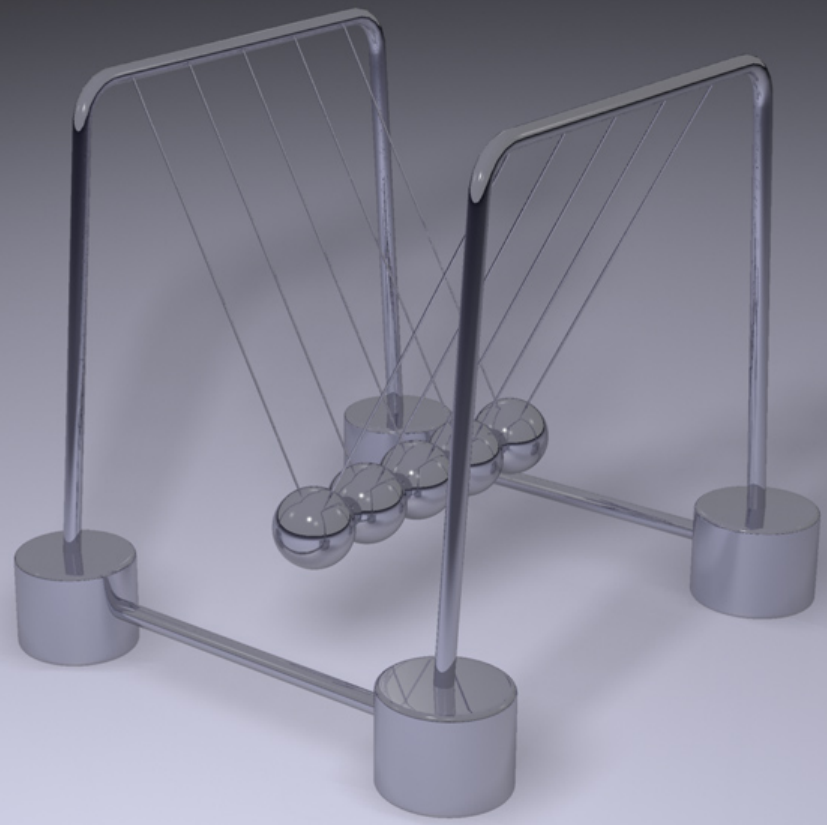
DM2212 Programming Physics



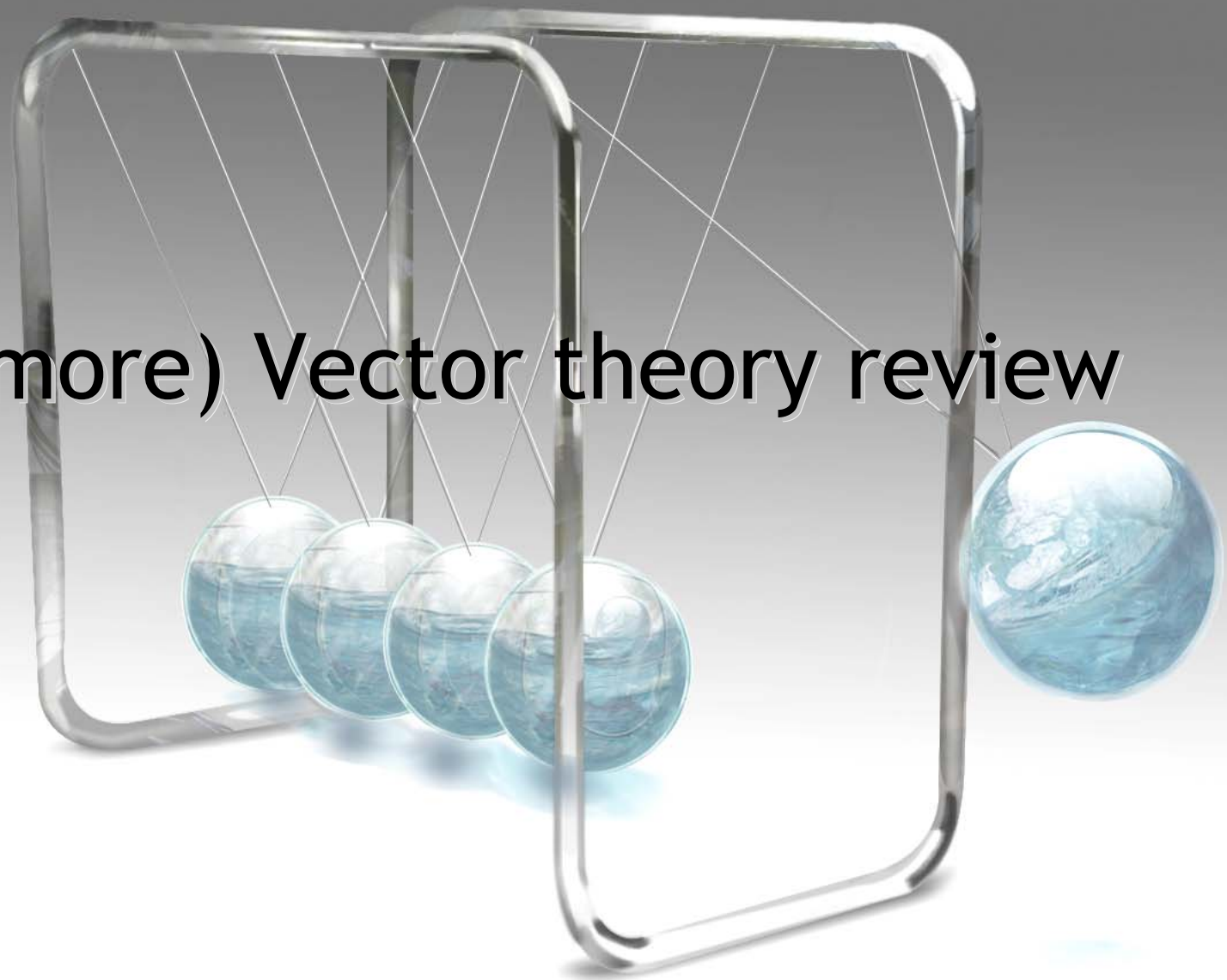
FALLING APPLES
MINDPHASE

ML: Dioselin Gonzalez

2007 S1

Image by mindphase.deviantart.com

(more) Vector theory review



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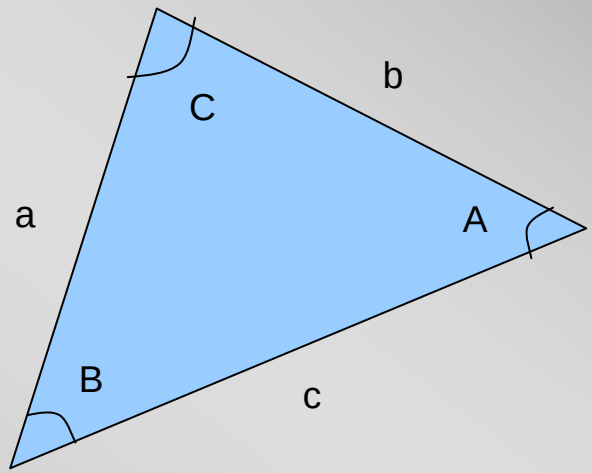
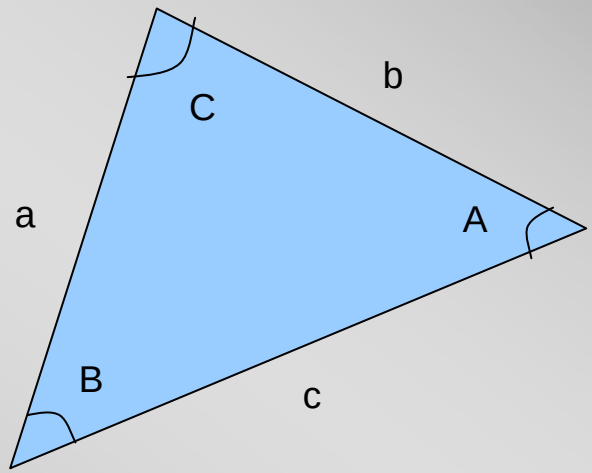
Law of sines



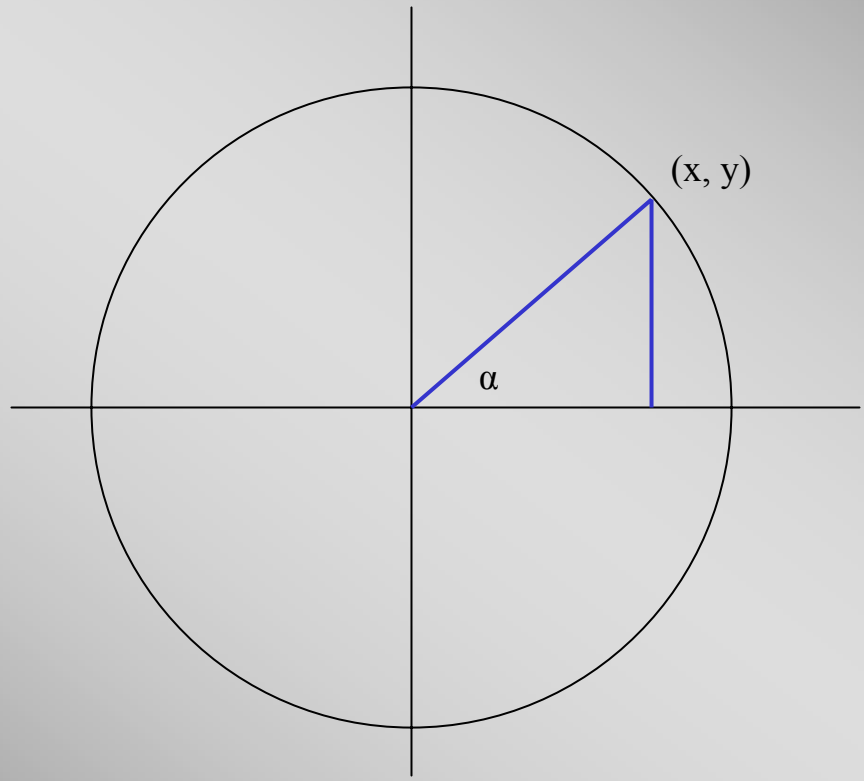
$$\frac{a}{\sin(A)} = \frac{b}{\sin(B)} = \frac{c}{\sin(C)}$$

Law of cosines



$$c^2 = a^2 + b^2 - 2abcos(C)$$

Unit circle



$x^2 + y^2 = 1$

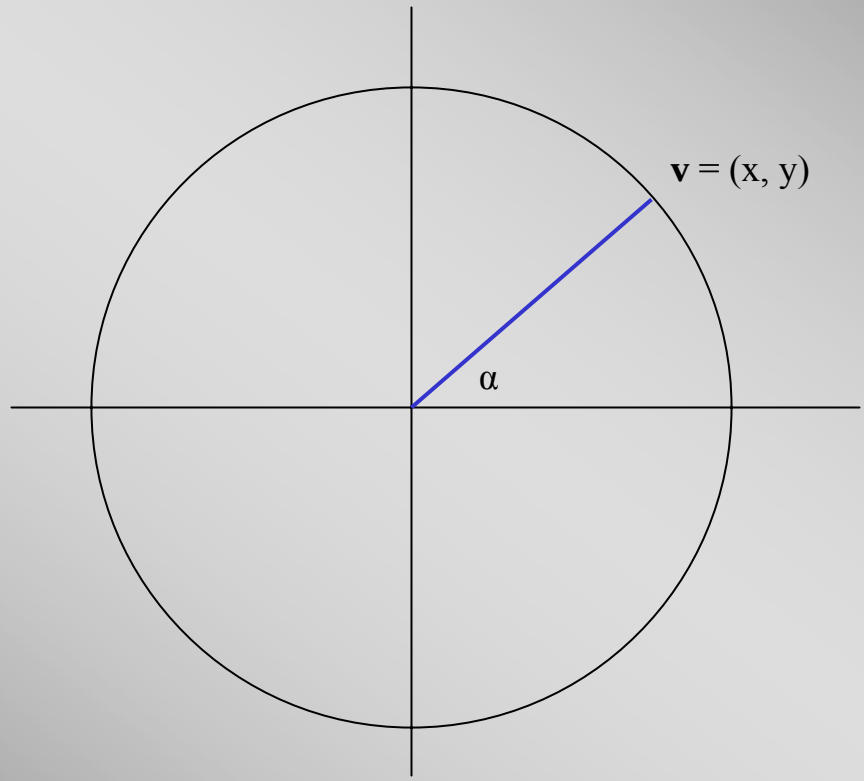
$\sin\alpha = y$ $\cos\alpha = x$

Let us proof…

1. $\mathbf{u} \cdot \mathbf{v} = |\mathbf{u}|\ |\mathbf{v}| \cos\varphi$
2. If $\mathbf{u} \neq \mathbf{0}$, then u and v are parallel if and only if $\mathbf{v} = k\mathbf{u}$ for a constant $k \neq 0$
3. If **u** and **v** are different than zero, then **u** and **v** are orthogonal iif $\mathbf{u} \cdot \mathbf{v} = 0$

4. $|\mathbf{u} \times \mathbf{v}| = |\mathbf{u}|\ |\mathbf{v}| \sin\varphi$
5. $\mathbf{u} \cdot (\mathbf{u} \times \mathbf{v}) = \mathbf{v} \cdot (\mathbf{u} \times \mathbf{v}) = \mathbf{0}$

Polar coordinates



v = |v| @ α

Lab

- Extend you vector library to:
  - Convert radians to degrees and vice versa
  - Convert to/from Cartesian coordinates to/from Polar coordinates

References