

Uniform Circular Motion Notes

Uniform Circular Motion

moving in a circle at a constant speed.

UCM is periodic motion - motion that repeats after an interval of time.

Period - the time it takes to complete one cycle.

- symbol = T - units - seconds - scalar

$$T = \frac{\text{time}}{\text{cycles}}$$

frequency - the number of cycles in a certain time

- symbol = f - units = $\frac{1}{s} = \text{Hertz} = \text{Hz}$ - scalar

$$f = \frac{\text{cycles}}{\text{time}}$$

$$f = \frac{1}{T}$$

The pendulum swung btf 5 times
in 15.3 s.

Find T + f .

$$T = \frac{\text{time}}{\text{cycles}} = \frac{15.3}{5} = 3.06 \text{ s}$$

$$f = \frac{1}{3.06} = 0.327 \text{ Hz} = \frac{5}{15.3}$$

Two types of UCM: $\ddot{n}$

Rotation - object spins about
an axis.

Revolution - object moves around
a central point.

Since UCM is circular an
object's $\vec{d}$ returns to $\emptyset \text{ m}$
after each revolution.

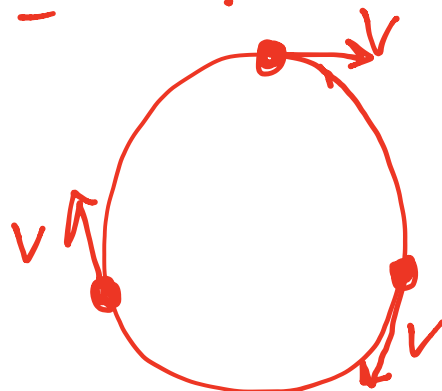
So we can't use $\vec{v} = \frac{\vec{d}}{t}$

We define:

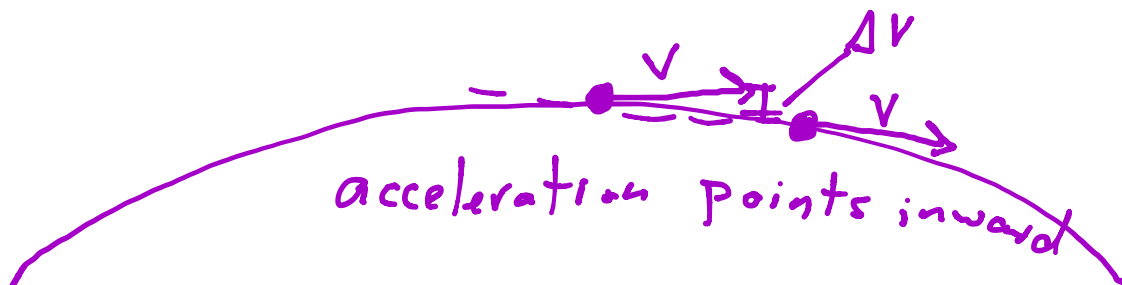
Linear speed - the speed an object in ucm would move if it moved in a straight line.

$$v = \frac{2\pi r}{T} = 2\pi r f$$

v points tangentially.



clockwise



acceleration points inward

Centripetal acceleration
center seeking
- an inward pointing acceleration that changes an object's direction.

- symbol = $\vec{a}_c$ - units = m/s^2 - vector

$$\vec{a}_c = \frac{v^2}{r}$$