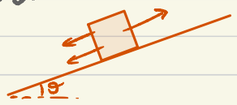
Power



Form 2 equations, then solve simultaneously

I) $P =$

II) a)

–

or b)

–

Elastics

Form 2 equations, then solve simultaneously

I) $T =$

II) a)

–

or b)

–

Tips: Max velocity when

i.e.

Max acceleration when

i.e.

Energy

Types of Energy

KE

GPE or

EPE

Work Done...

... against friction

... by engine/person

Work-Energy Principle

initial KE + initial GPE + initial EPE + work done = final KE + final GPE + final EPE

1D Collisions

Impulse-Momentum Principle

$I =$ $I =$

Take direction of as direction

Principle of Conservation of Linear Momentum, PCLM

Initial momentum = final momentum Direction matters!

Newton's Law of Restitution, NLR

e is the

e If e =

If e =

e =

Strategy:

eg. 

PCLM

NLR

Collision Logic

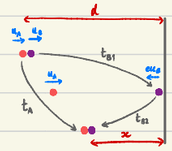
If P reverses

If Q stays same

Distance Problems

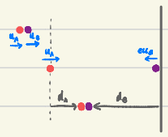
Constant velocity, use

Collision, wall bounce, 2nd collision – "Find x"



Strategy 1 (Times)

- Compare the time it takes between collisions for A and B



Strategy 2 (Distance Ratios)

- If we know how far apart A and B are when B hits the wall, then speeds will be in same ratio as distances travelled i.e. is equivalent to

2D Collisions – one sphere

Impulse-Momentum Principle

$\underline{I} =$

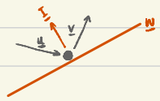
Collisions with known angle of approach

Find v?

β?

Vector collisions where wall is in $\underline{i}$ or $\underline{j}$ direction

Vector collisions where wall is not $\underline{i}$ or $\underline{j}$ direction



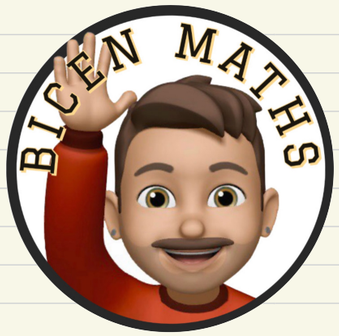
Conservation of velocity parallel to wall

Impact law for perpendicular to wall

$\underline{I}$? Use

$\underline{I} \leftrightarrow \underline{w}$?

Multiple Walls

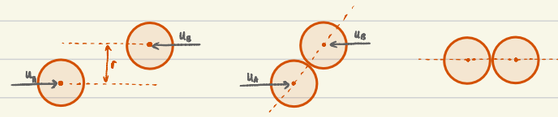


2D Collisions – two spheres

Collisions with known angles to line of centres

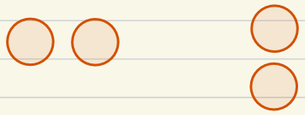
Strategy:

Collisions with unknown angles: geometric problems



... then same strategy as before

Vector collisions where line of centres is along $\underline{i}$ or $\underline{j}$



Vector collisions with unknown line of centres

3 of 4 known velocities?

Direction of line of centres is same as

Conservation perp. to line of centres

Impact law parallel to line of centres

Angles of Deflection

How much the original path is rotated/turned

If $\underline{u}$ and $\underline{v}$ are known...