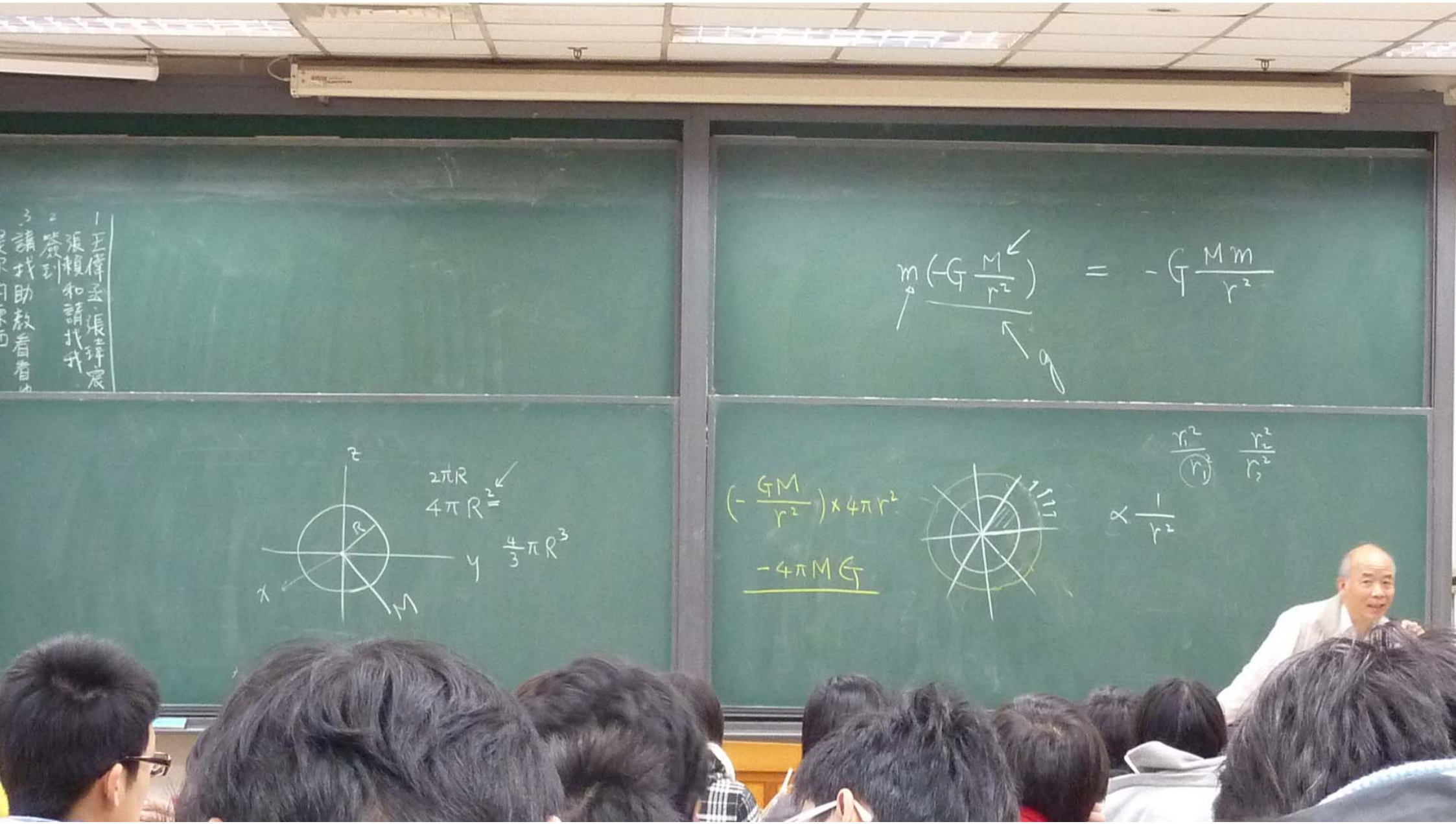
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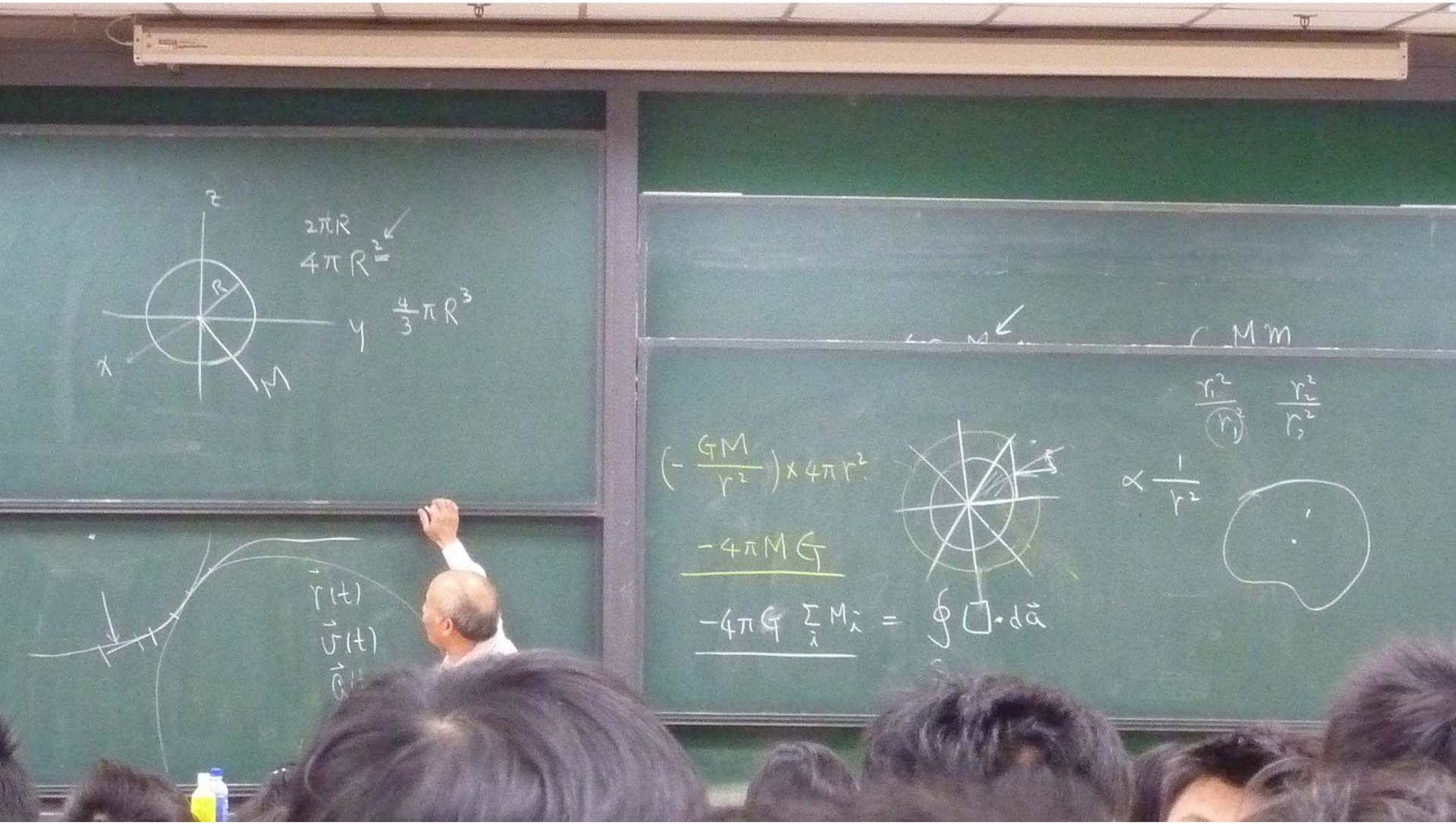
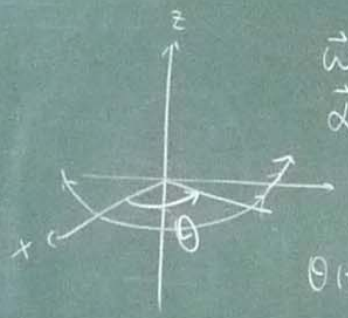
3 請找助教看看
$m\left(-G\frac{M}{r^2}\right) = -G\frac{Mm}{r^2}$
g
z
$2\pi R$
$4\pi R^2$
R
y
x
M
$\frac{4}{3}\pi R^3$
$\left(-\frac{GM}{r^2}\right)\times 4\pi r^2$
$-4\pi MG$
$\frac{r_1^2}{r_1^2}$ $\frac{r_2^2}{r_2^2}$
$\propto \frac{1}{r^2}$


z
R
x
M
2πR
4πR²
y
4/3 πR³
M m
r₁²/r₁³
r₂²/r₂²
(- GM/r²) × 4πr²
-4πMG
-4πG Σ Mᵢ = ∮ □ · dā
∝ 1/r²
r(t)
v(t)

$\theta \leftrightarrow \vec{r}$

$\vec{\omega} \leftrightarrow \vec{v}$

$\vec{\alpha} \leftrightarrow \vec{a}$



$\vec{\omega} = \frac{d\theta}{dt}\hat{z}$

$\vec{\alpha} = \frac{d\vec{\omega}}{dt}$

$\theta(t) = \theta_0 + \frac{1}{2}\alpha t^2$

$\left(-\frac{GM}{r^2}\right) \times 4\pi r^2$

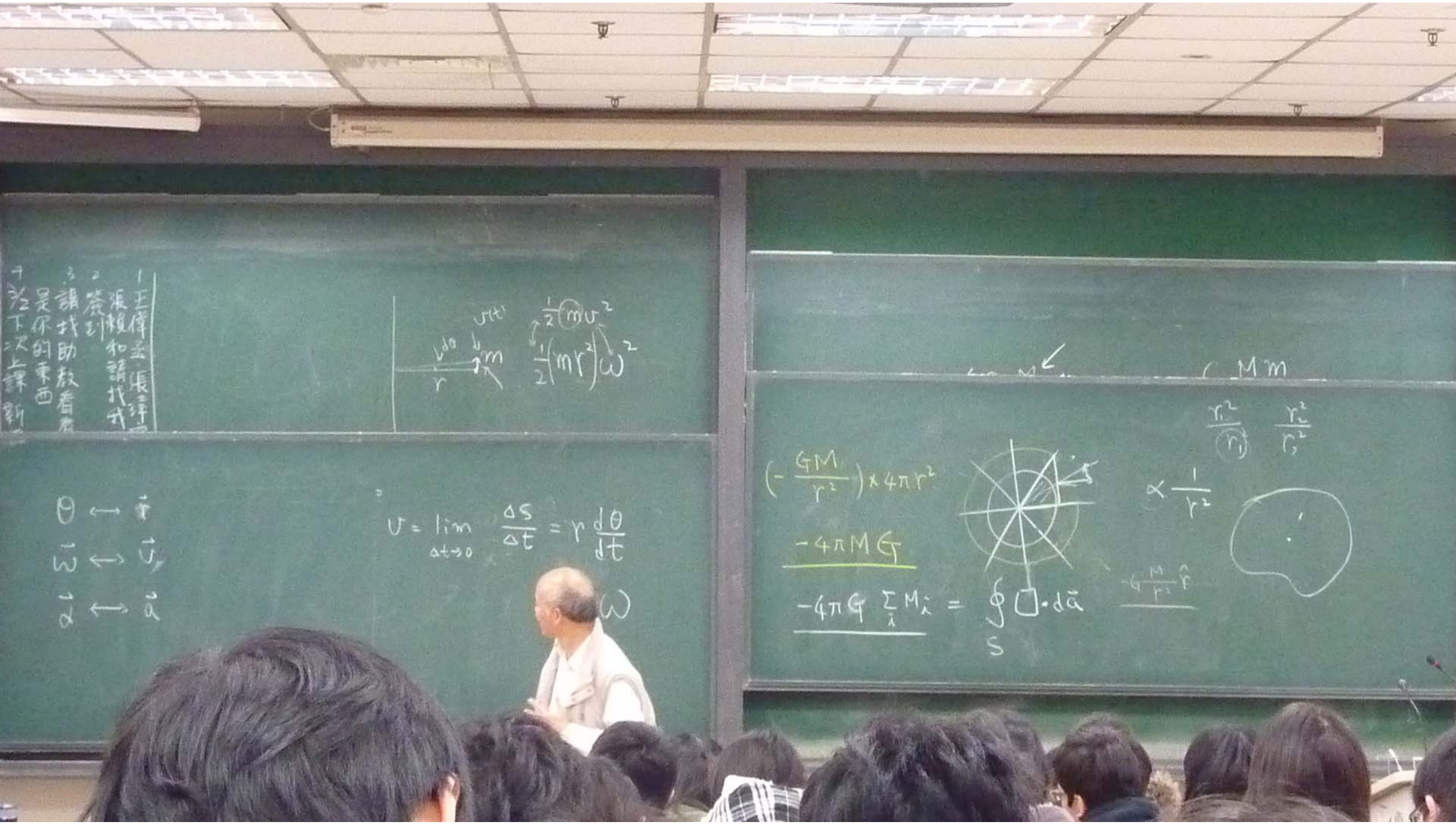
$-4\pi M G$

$-4\pi G \sum_i M_i = \oint_S \square \cdot d\vec{a}$

$\frac{r_1^2}{r_1^2}$ $\frac{r_2^2}{r_2^2}$

$\propto \frac{1}{r^2}$

$-G\frac{M}{r^2}\hat{r}$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3 請找助教看看
是你的東西
下次上課新
v(t)
$\frac{1}{2}mv^2$
$\frac{1}{2}(mr^2)\omega^2$
$\theta \leftrightarrow \vec{r}$
$\vec{\omega} \leftrightarrow \vec{v}$
$\vec{\alpha} \leftrightarrow \vec{a}$
$v = \lim_{\Delta t \to 0} \frac{\Delta s}{\Delta t} = r\frac{d\theta}{dt}$
ω
$(-\frac{GM}{r^2}) \times 4\pi r^2$
$-4\pi MG$
$-4\pi G \sum_i M_i = \oint_S \square \cdot d\vec{a}$
$\propto \frac{1}{r^2}$
$-G\frac{M}{r^2}\hat{r}$

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4 沒下次上課新手

$$\sum_{i=1}^{5} \frac{1}{2} m_i v_i^2$$
$$= \sum_{i=1}^{5} \frac{1}{2} m_i r_i^2 \omega^2$$
$$= \frac{1}{2} \left(\sum_{i=1}^{5} m_i r_i^2 \right) \omega^2$$

$v(t)$ $v\,d\theta$ r m

$\frac{1}{2} m v^2$
$\frac{1}{2} (mr^2) \omega^2$

$\theta \leftrightarrow \vec{r}$
$\vec{\omega} \leftrightarrow \vec{v}$
$\vec{\alpha} \leftrightarrow \vec{a}$

I=the moment of inertia

$$v = \lim_{\Delta t \to 0} \frac{\Delta s}{\Delta t} = r \frac{d\theta}{dt}$$

$r_5 m_5$ $r_4 m_4$ $r_3 m_3$ $r_2 m_2$ $r_1 m_1$ $= I\omega$

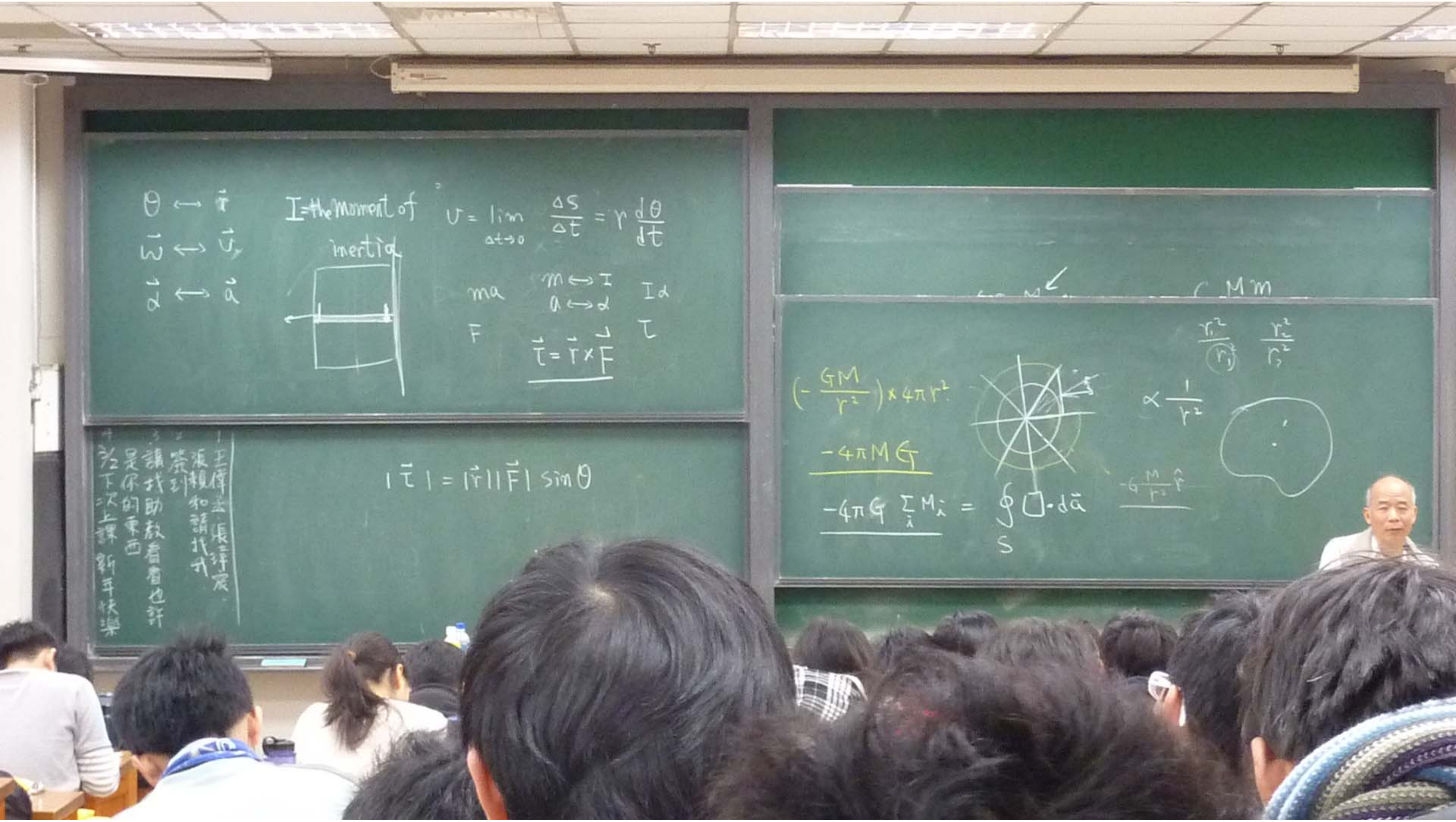
M m

$$\left(-\frac{GM}{r^2} \right) \times 4\pi r^2$$
$$-4\pi M G$$
$$-4\pi G \sum_i M_i = \oint_S \square \cdot d\vec{a}$$

$\frac{r_1^2}{r_1^2}$ $\frac{r_2^2}{r_2^2}$

$\propto \frac{1}{r^2}$

$-G \frac{M}{r^2} \hat{r}$


θ ⟷ r⃗
ω⃗ ⟷ v⃗
α⃗ ⟷ a⃗
I = the moment of inertia
v = lim Δs/Δt = r dθ/dt
ma   m ⟷ I   Iα
a ⟷ α
F   τ
τ⃗ = r⃗ × F⃗
|τ⃗| = |r⃗||F⃗| sin θ
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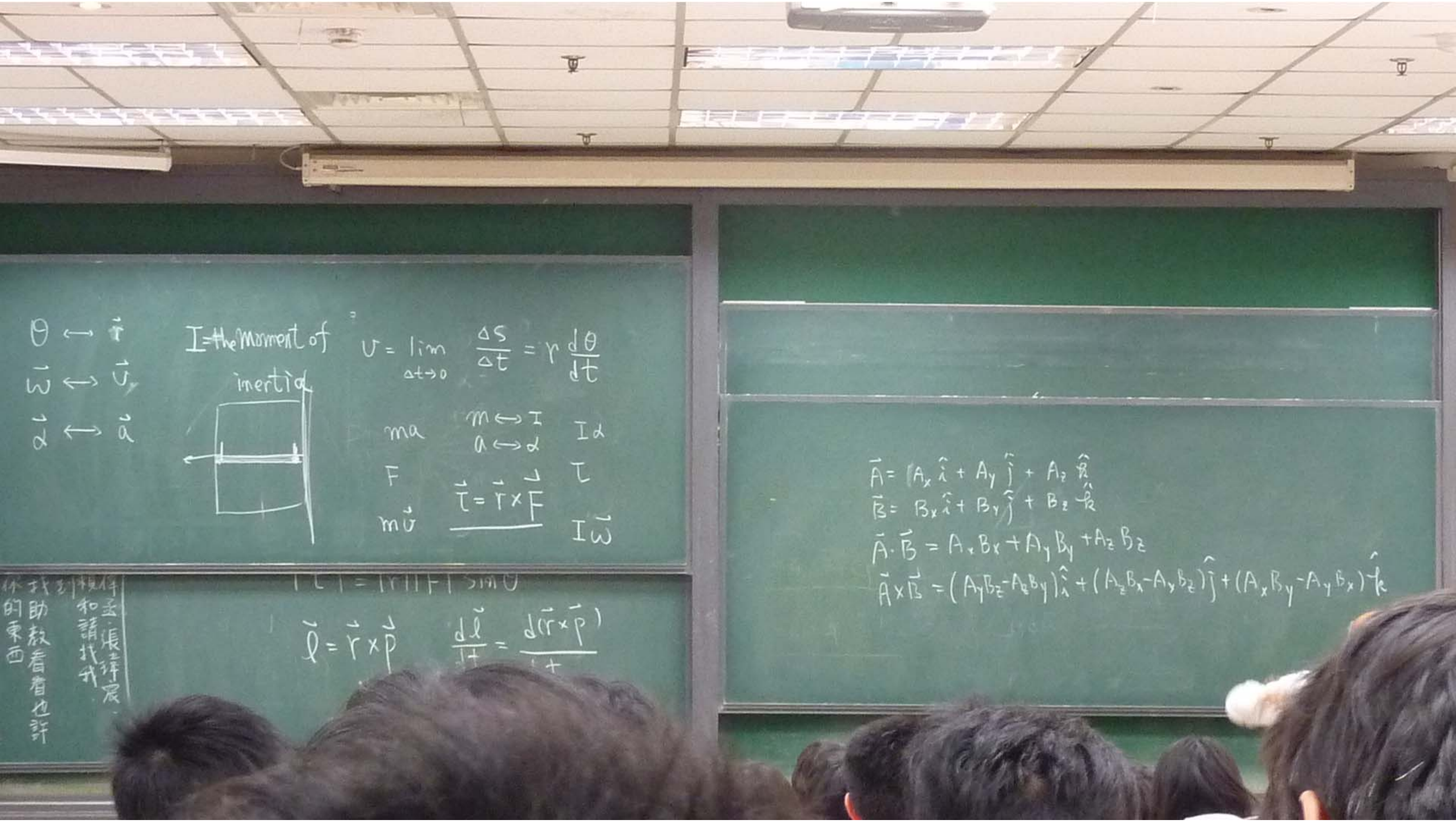
是你的東西
新年快樂
(−GM/r²) × 4πr²
−4πMG
−4πG Σ M_i = ∮ □ · da⃗
S
∝ 1/r²



I = the moment of inertia
v = lim Δs/Δt = r dθ/dt
Δt→0
ma m ⟷ I Iα
a ⟷ α
F τ = r × F τ
mv Iω
l = r × p
A = Ax i + Ay j + Az k
B = Bx i + By j + Bz k
A · B = Ax Bx + Ay By + Az Bz
A × B = (Ay Bz - Az By) i + (Az Bx - Ax Bz) j + (Ax By - Ay Bx) k