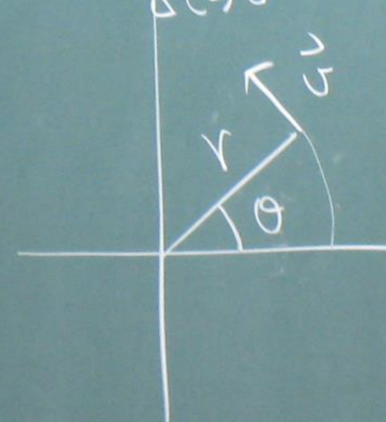
$$\left(\tfrac{1}{2} m_i r_i^2\right) \omega^2 = \frac{1}{2} \sum_{i=1}^{n} \left(m_i r_i^2\right) \omega^2 = \frac{1}{2} I \omega^2$$

$$\vec{v} = \lim_{\Delta t \to 0} \frac{r(\theta + d\theta) \cdots}{\Delta t}$$

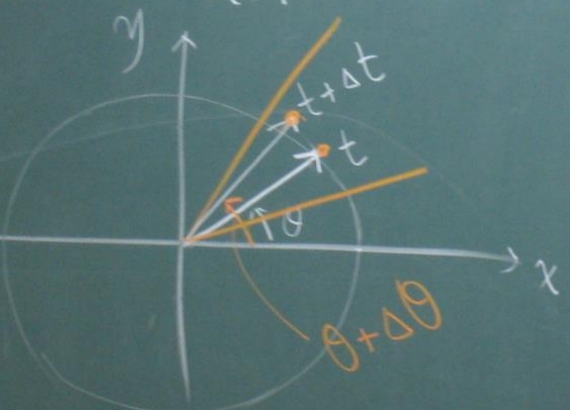
$$\frac{(\theta + \Delta\theta) - \theta}{\Delta t} = \lim_{\Delta t \to 0} \frac{\Delta \theta}{\Delta t} \equiv \frac{d\theta}{dt}$$

$\hat{z}$ ↕ m



$$\frac{\vec{\omega}(t + \Delta t) - \vec{\omega}(t)}{\Delta t} = \frac{d\vec{\omega}}{dt}$$

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

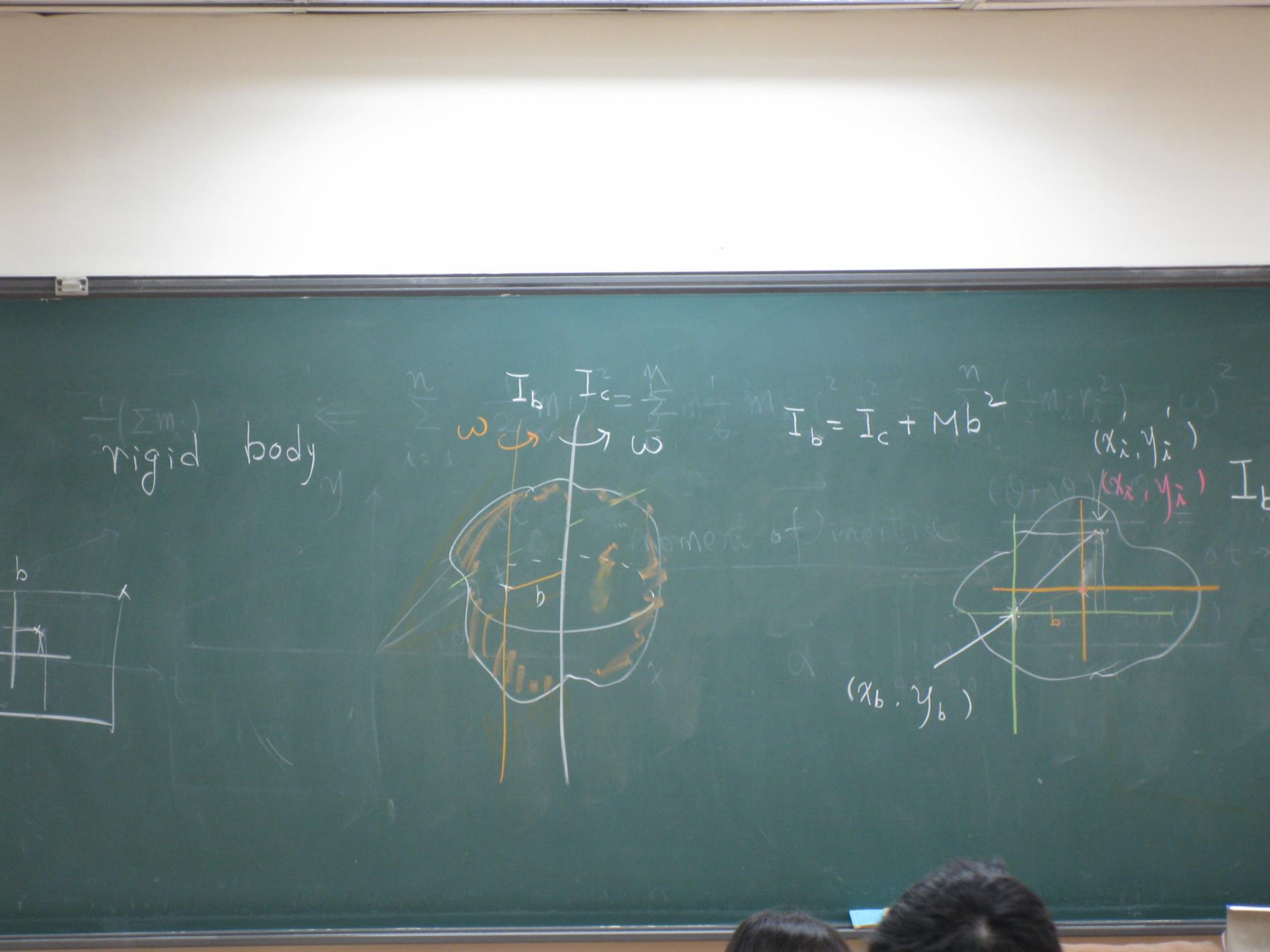


$$\frac{(\theta+\Delta\theta)-\theta}{\Delta t} = \lim_{\Delta t \to 0} \frac{\Delta\theta}{\Delta t} \equiv \frac{d\theta}{dt}$$

$\hat{z}$

m

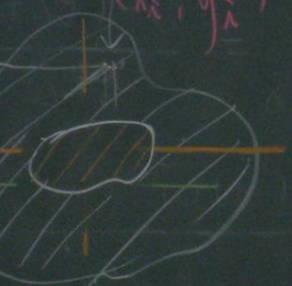
$$\frac{\ldots+\Delta t) - \vec{\omega}(t)}{\Delta t} = \frac{d\vec{\omega}}{dt}$$


rigid body
I_b
I_c
ω
ω
b
I_b = I_c + Mb^2
(x_i', y_i')
(x_i, y_i)
I_b
b
(x_b, y_b)

$(x_b^2+y_b^2)\sum m_i$ M

(x_i', y_i')

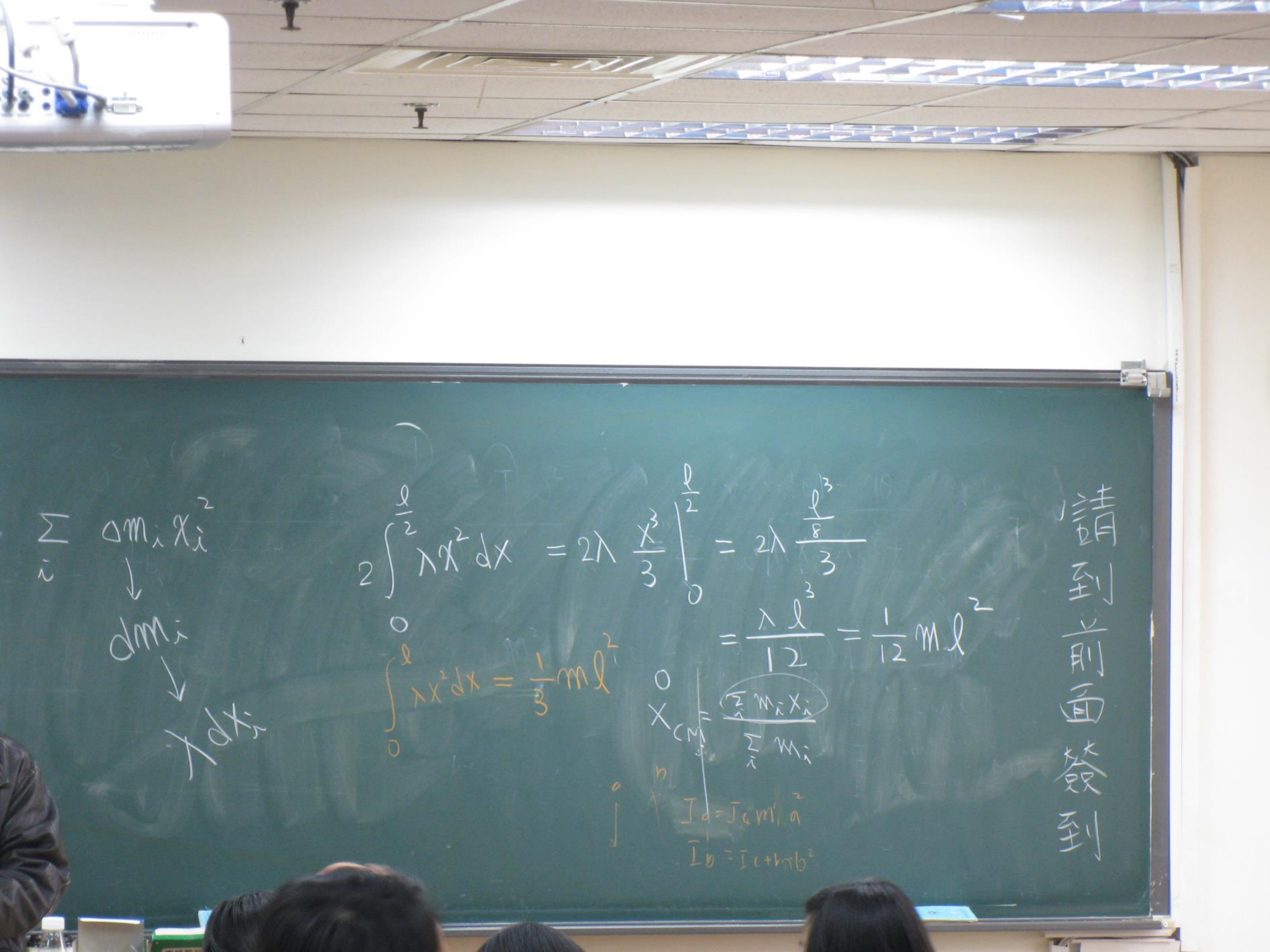
(x_i, y_i)



$$I_b = \sum_i m_i r_i'^2 = \sum_i m_i (x_i'^2 + y_i'^2) = \sum_i m_i \left[(x_i - x_b)^2 + (y_i - y_b)^2\right]$$

$$= \sum_i m_i \left[(x_i^2 - 2x_b x_i + x_b^2) + (y_i^2 - 2y_b y_i + y_b^2)\right]$$

$$I_b = I_c + Mb^2$$



$\sum_i \Delta m_i x_i^2$
dm_i
λdx_i
$2\int_0^{\frac{l}{2}} \lambda x^2 dx = 2\lambda \frac{x^3}{3}\Big|_0^{\frac{l}{2}} = 2\lambda \frac{\frac{l^3}{8}}{3}$
$= \frac{\lambda l^3}{12} = \frac{1}{12} m l^2$
$\int_0^l \lambda x^2 dx = \frac{1}{3} m l^2$
$X_{CM} = \frac{\sum_i m_i X_i}{\sum_i m_i}$
請到前面簽到