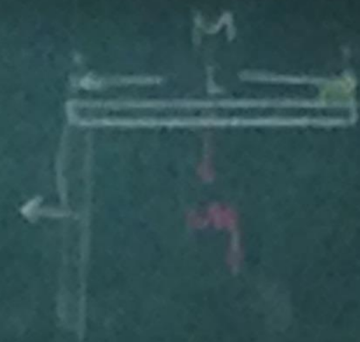
I



$$I = \frac{1}{3} M L^2$$

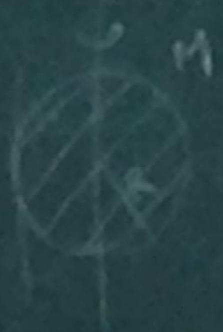
$$\tau = \frac{L}{2} \times Mg = I\alpha = \frac{1}{3} ML^2 \alpha$$

$$\alpha = \frac{3}{2} \frac{g}{L}$$

a

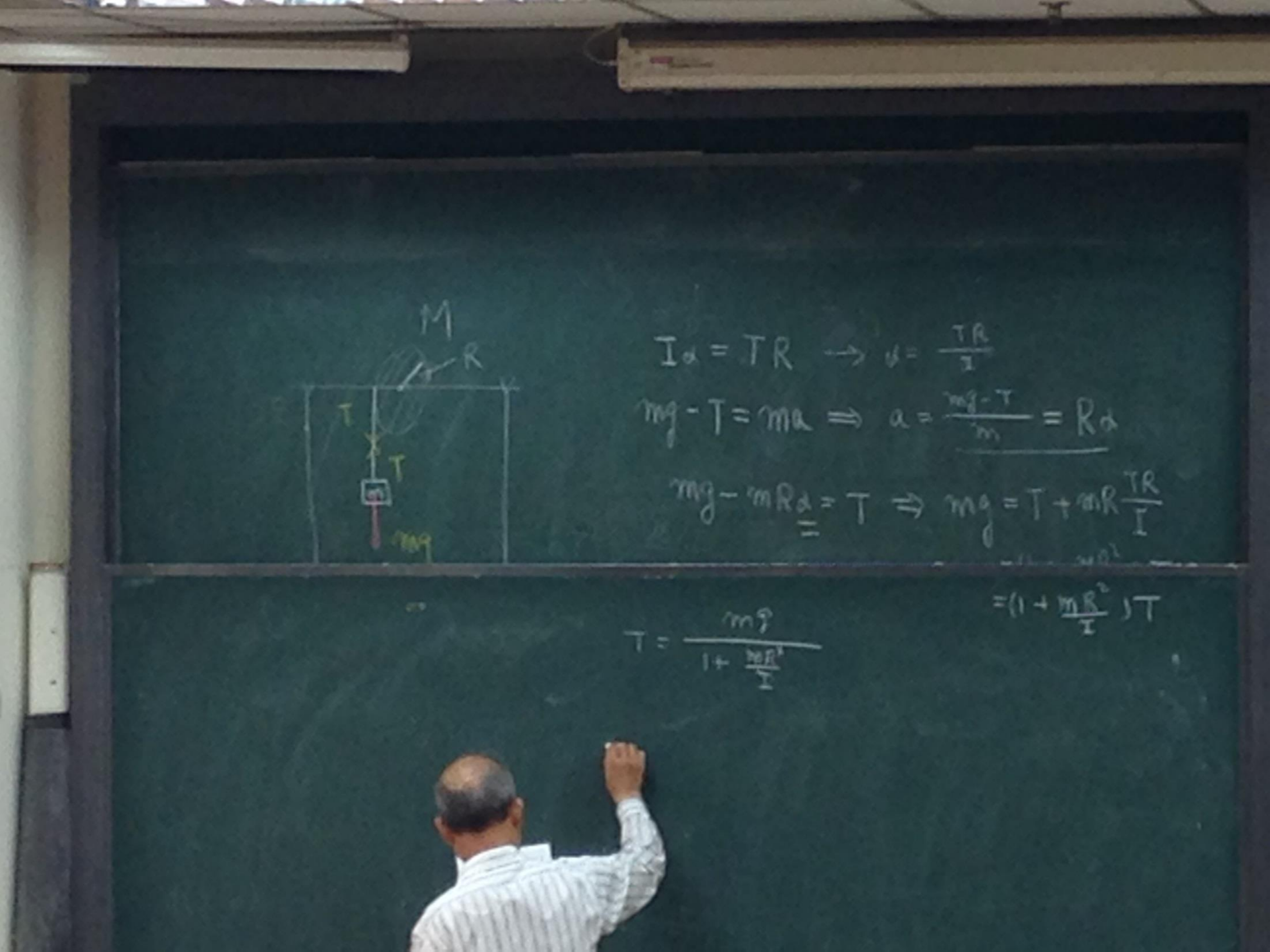
$$\frac{1}{2} I\omega^2 = \frac{1}{2} Mg\, L$$

$$\frac{1}{3} ML^2 \omega^2 = MgL \qquad \omega = \sqrt{\frac{3g}{L}}$$



$\boxed{MR^2}$ $\quad \boxed{\frac{1}{2} MR^2}$

$\frac{1}{2} MR^2 \quad \frac{1}{4} MR^2$


M
R
T
T
m
mg
$I\alpha = TR \rightarrow \alpha = \frac{TR}{I}$
$mg - T = ma \Rightarrow a = \frac{mg - T}{m} = R\alpha$
$mg - mR\alpha = T \Rightarrow mg = T + mR\frac{TR}{I}$
$= (1 + \frac{mR^2}{I})T$
$T = \frac{mg}{1 + \frac{mR^2}{I}}$

$$= \left(1 + \frac{mR^2}{I}\right) T$$

$$T = \frac{mg}{1 + \frac{mR^2}{I}}$$

$$mg - \frac{mg}{1 + \frac{mR^2}{I}} = ma$$

$$a = g\left(1 - \frac{1}{1 + \frac{MR^2}{I}}\right) = g\,\frac{MR^2/I}{1 + \frac{MR^2}{I}}$$

$$= g\,\frac{1}{1 + \frac{I}{MR^2}}$$

$\lambda L = m$

πx^2

$\int^{L} \lambda x^2 \, dx$

$\frac{dL}{dt} = \tau$

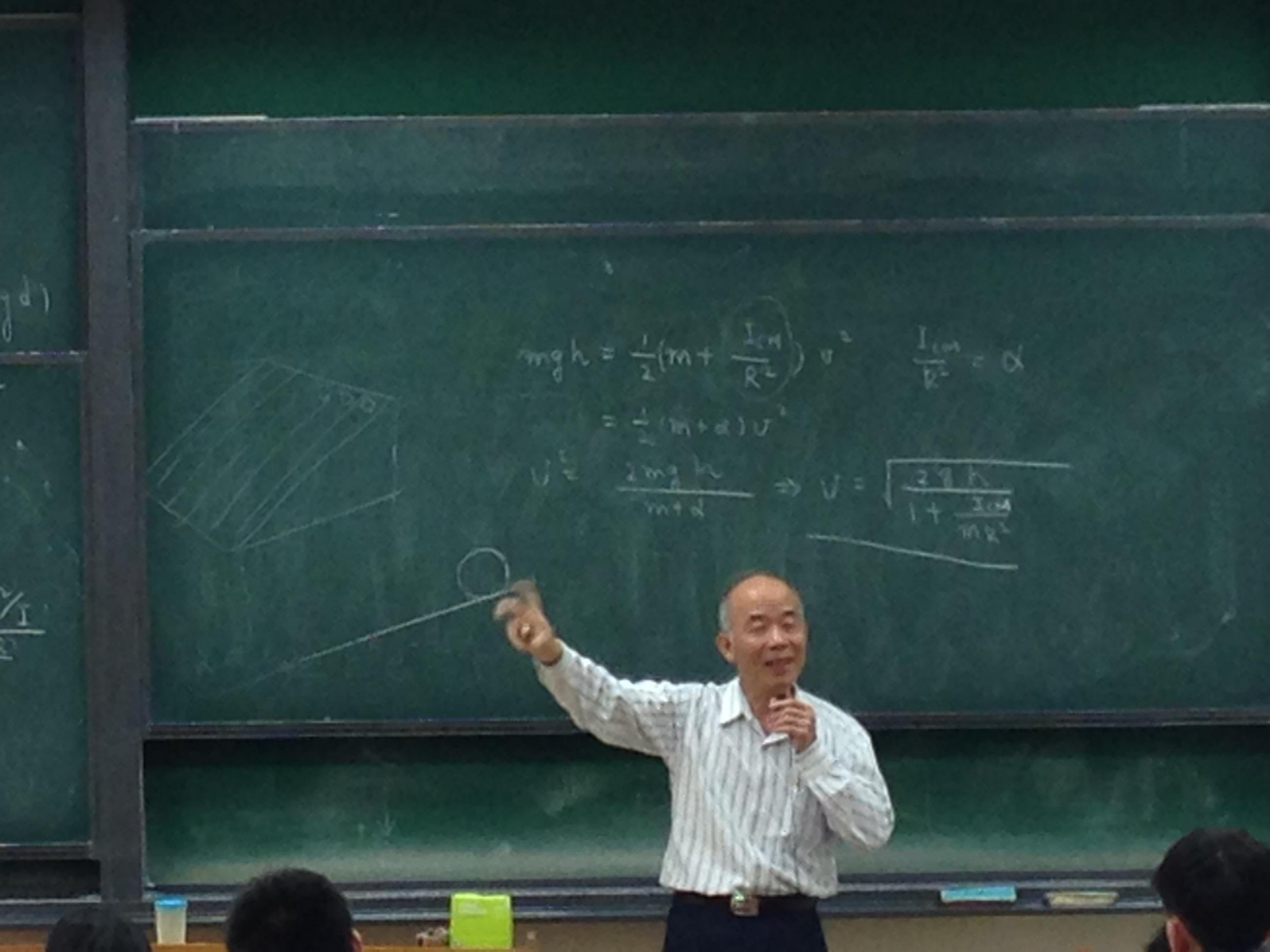
$L = \underline{m_1} v \underline{R} + \underline{m_2} v \underline{R} + I \frac{v}{R}$

$\tau = m_1 g R - m_2 g R = \frac{dL}{dt} = \left(m_1 R + m_2 R + \frac{I}{R}\right) \frac{dv}{dt} \longrightarrow a$

$\vec{r} \times \vec{p}$

$I \vec{\omega}$

$$a = \frac{(m_1 - m_2) g R}{(m_1 + m_2) R + \frac{I}{R}} = \frac{(m_1 - m_2) g}{m_1 + m_2 + \frac{I}{R^2}}$$



mgh = 1/2 (m + Icm/R^2) v^2
Icm/R^2 = α
= 1/2 (m + α) v^2
v^2 = 2mgh/(m+α) => v = sqrt(2gh/(1 + Icm/mR^2))