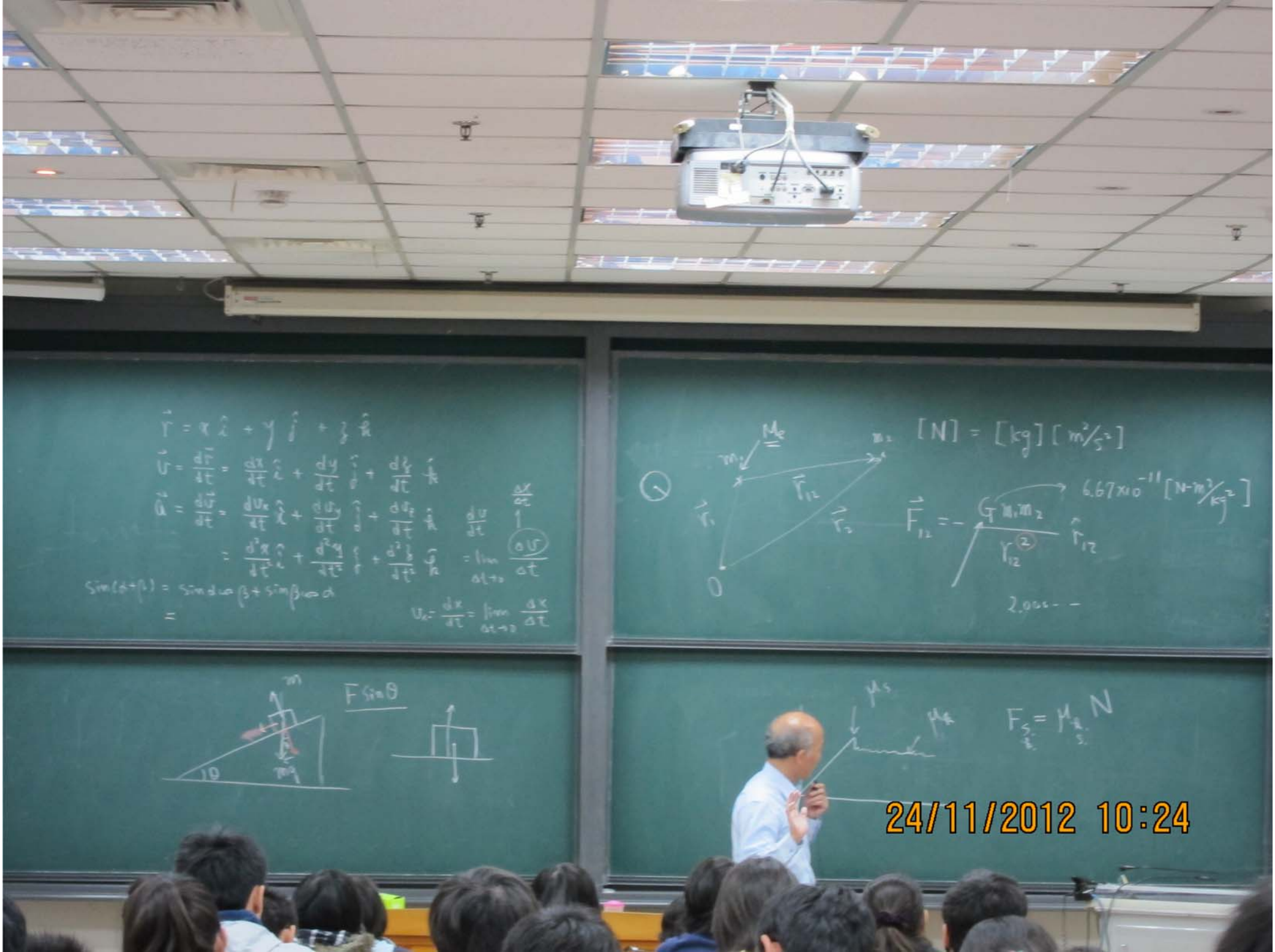
$\vec{r} = x\hat{i} + y\hat{j} + z\hat{k}$
$\vec{v} = \frac{d\vec{r}}{dt} = \frac{dx}{dt}\hat{i} + \frac{dy}{dt}\hat{j} + \frac{dz}{dt}\hat{k}$
$\vec{a} = \frac{d\vec{v}}{dt} = \frac{dv_x}{dt}\hat{i} + \frac{dv_y}{dt}\hat{j} + \frac{dv_z}{dt}\hat{k}$
$= \frac{d^2x}{dt^2}\hat{i} + \frac{d^2y}{dt^2}\hat{j} + \frac{d^2z}{dt^2}\hat{k}$
$\frac{dv}{dt} = \lim_{\Delta t \to 0} \frac{\Delta v}{\Delta t}$
$\sin(\alpha+\beta) = \sin\alpha\cos\beta + \sin\beta\cos\alpha$
$v_x = \frac{dx}{dt} = \lim_{\Delta t \to 0} \frac{\Delta x}{\Delta t}$
$[N] = [kg][m/s^2]$
$\vec{F}_{12} = -G\frac{m_1 m_2}{r_{12}^2}\hat{r}_{12}$
$6.67 \times 10^{-11}\ [N\text{-}m^2/kg^2]$
$F\sin\theta$
$F_s = \mu_s N$
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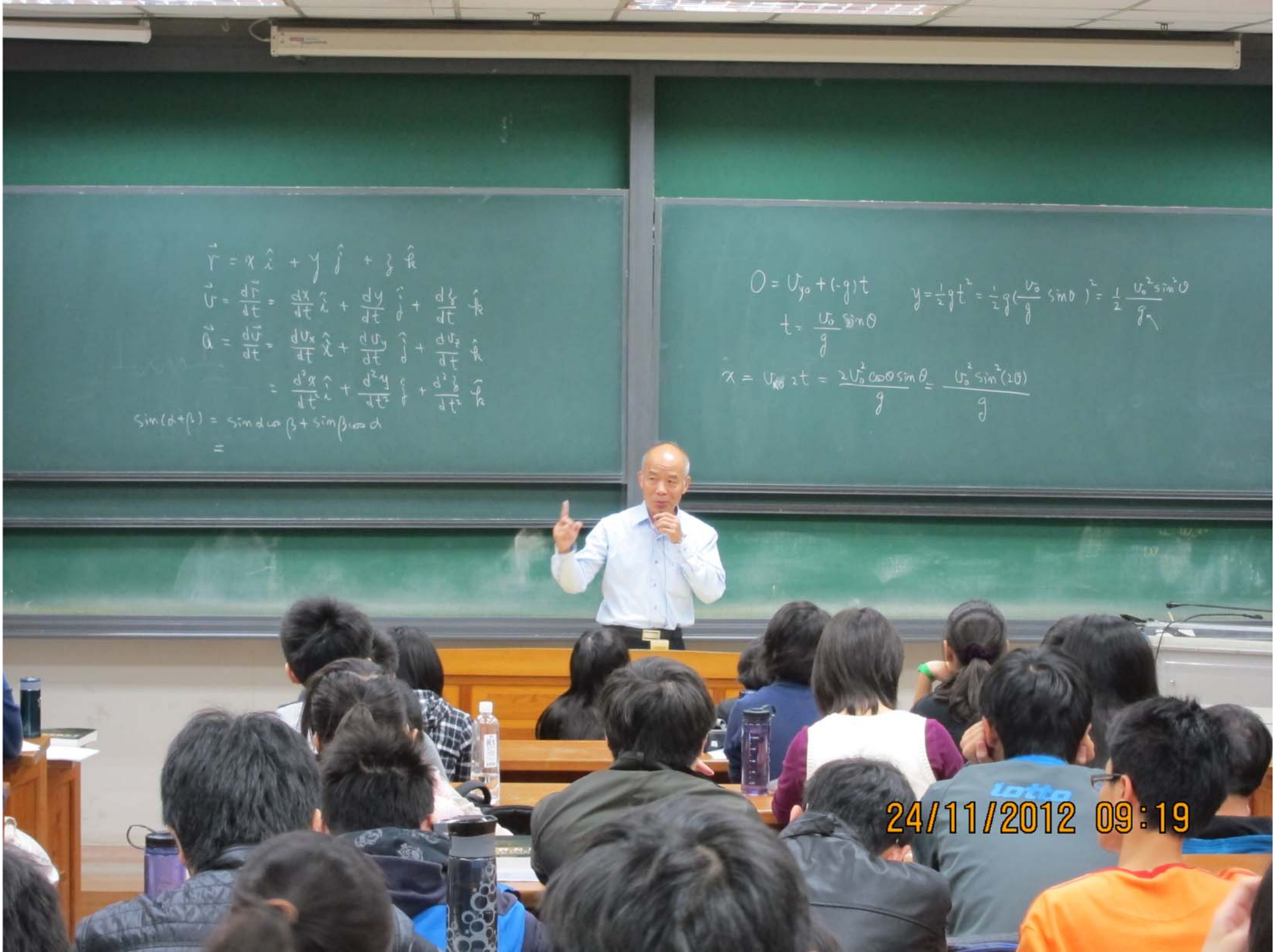
$\vec{r} = x\hat{i} + y\hat{j} + z\hat{k}$
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$\sin(\alpha+\beta) = \sin\alpha\cos\beta + \sin\beta\cos\alpha$
$=$
$0 = v_{y0} + (-g)t$
$t = \frac{v_0}{g}\sin\theta$
$y = \frac{1}{2}gt^2 = \frac{1}{2}g\left(\frac{v_0}{g}\sin\theta\right)^2 = \frac{1}{2}\frac{v_0^2\sin^2\theta}{g}$
$x = v_{x0}\,2t = \frac{2v_0^2\cos\theta\sin\theta}{g} = \frac{v_0^2\sin^2(2\theta)}{g}$
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