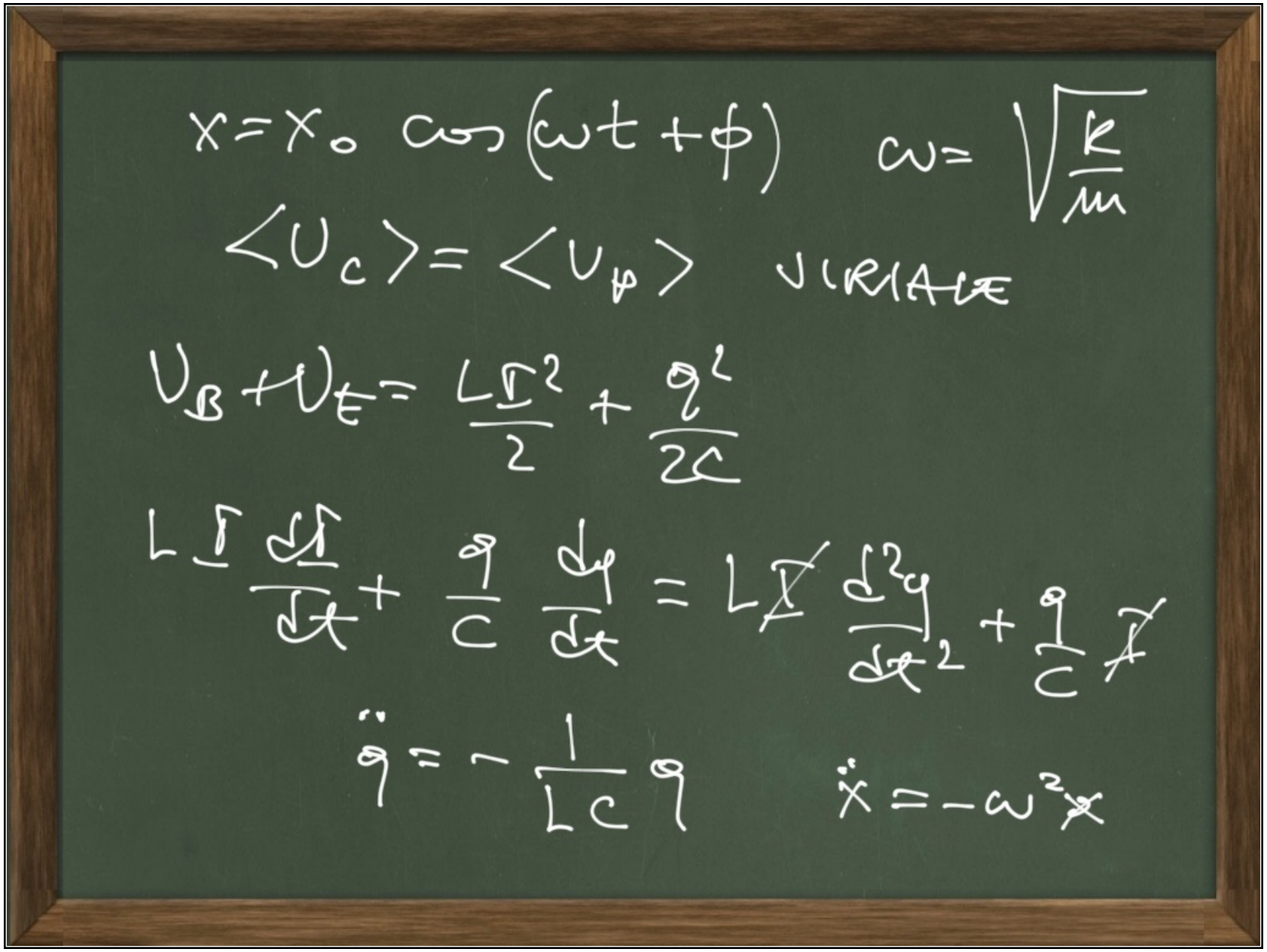
Circuito LC

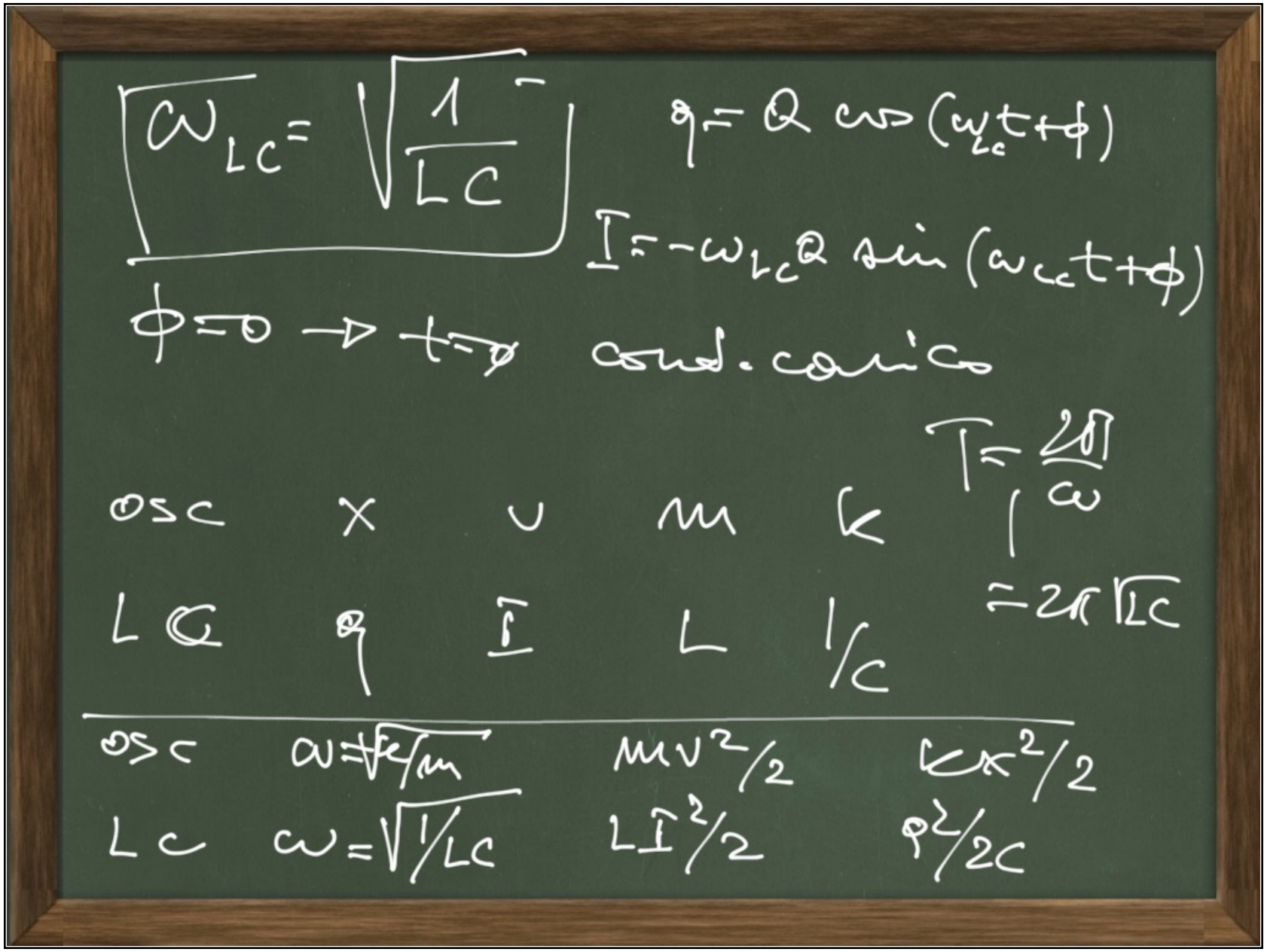
$$U = U_E + U_B = \frac{q^2}{2C} + \frac{LI^2}{2}$$

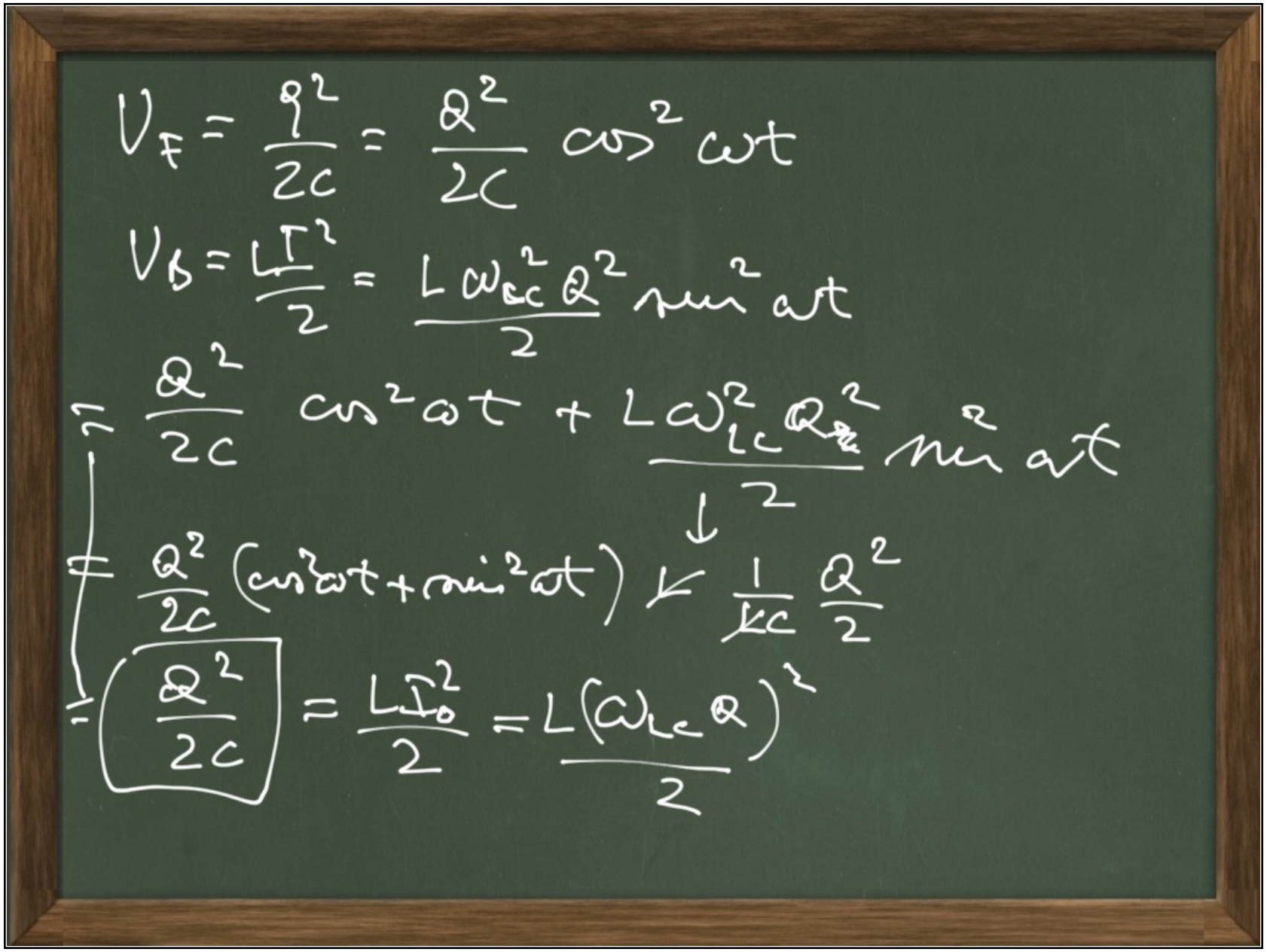
$$E = \frac{mv^2}{2} + \frac{kx^2}{2} \qquad \frac{dE}{dt} = 0 = mv\frac{dv}{dt} + kx\frac{dx}{dt}$$

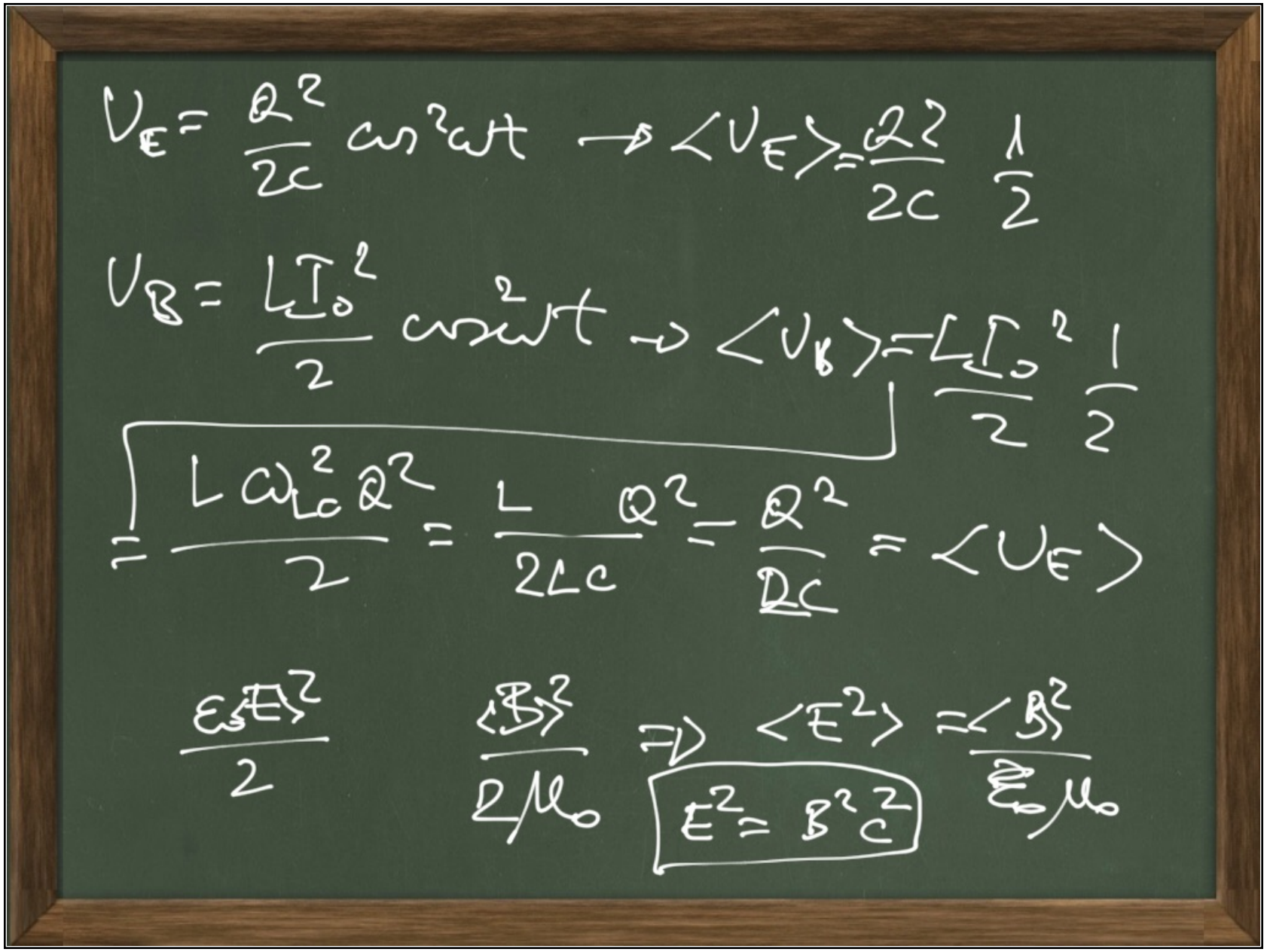
$$m\frac{d^2x}{dt^2} + kx\frac{dx}{dt} = 0$$

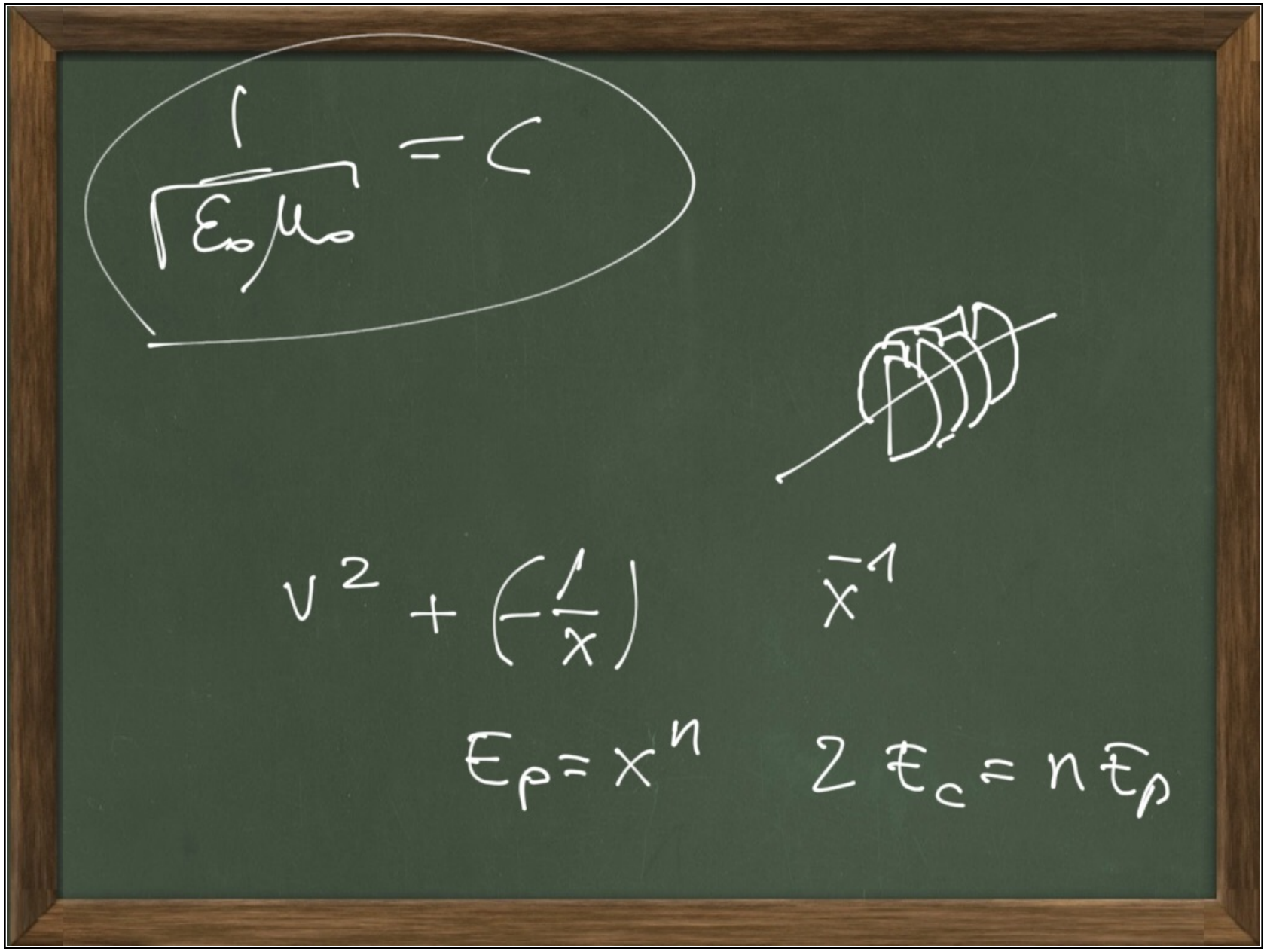
$$m\ddot{x} = -kx \qquad \ddot{x} = -\omega^2 x$$


$x = x_0 \cos(\omega t + \phi) \quad \omega = \sqrt{\frac{k}{m}}$
$\langle U_c \rangle = \langle U_\phi \rangle$ VIRIALE
$U_B + U_E = \frac{L I^2}{2} + \frac{q^2}{2C}$
$L I \frac{dI}{dt} + \frac{q}{C} \frac{dq}{dt} = L I \frac{d^2 q}{dt^2} + \frac{q}{C} I$
$\ddot{q} = -\frac{1}{LC} q \qquad \ddot{x} = -\omega^2 x$


$\omega_{LC} = \sqrt{\frac{1}{LC}}$
$q = Q \cos(\omega_{LC} t + \phi)$
$I = -\omega_{LC} Q \sin(\omega_{LC} t + \phi)$
$\phi = 0 \rightarrow t = 0$ cond. comico
$T = \frac{2\pi}{\omega} = 2\pi\sqrt{LC}$
osc x v m k
LC q I L 1/C
osc $\omega = \sqrt{k/m}$ $mv^2/2$ $kx^2/2$
LC $\omega = \sqrt{1/LC}$ $LI^2/2$ $q^2/2C$


$V_F = \frac{q^2}{2C} = \frac{Q^2}{2C}\cos^2\omega t$
$V_B = \frac{LI^2}{2} = \frac{L\omega_{LC}^2 Q^2}{2}\sin^2\omega t$
$= \frac{Q^2}{2C}\cos^2\omega t + \frac{L\omega_{LC}^2 Q^2}{2}\sin^2\omega t$
$= \frac{Q^2}{2C}(\cos^2\omega t + \sin^2\omega t)$
$\frac{1}{LC}\frac{Q^2}{2}$
$= \frac{Q^2}{2C} = \frac{LI_0^2}{2} = \frac{L(\omega_{LC}Q)^2}{2}$


$U_E = \frac{Q^2}{2C}\cos^2\omega t \rightarrow \langle U_E\rangle = \frac{Q^2}{2C}\frac{1}{2}$
$U_B = \frac{LI_0^2}{2}\cos^2\omega t \rightarrow \langle U_B\rangle = \frac{LI_0^2}{2}\frac{1}{2}$
$= \frac{L\omega_{LC}^2 Q^2}{2} = \frac{L}{2LC}Q^2 = \frac{Q^2}{2C} = \langle U_E\rangle$
$\frac{\varepsilon_0\langle E^2\rangle}{2}$
$\frac{\langle B^2\rangle}{2\mu_0} \Rightarrow \langle E^2\rangle = \frac{\langle B^2\rangle}{\varepsilon_0\mu_0}$
$E^2 = B^2c^2$


$\frac{1}{\sqrt{\varepsilon_0 \mu_0}} = c$
$v^2 + \left(-\frac{1}{x}\right)$
$\bar{x}^{-1}$
$E_p = x^n$
$2 E_c = n E_p$