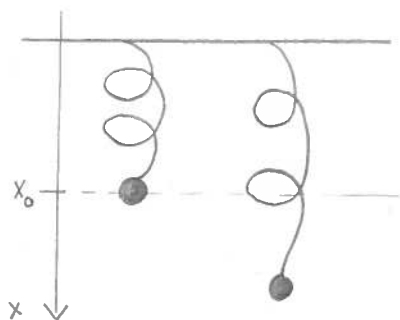


# REPETITION 26/10

$$x'' + p(t)x' + q(t)x = f(t)$$

second-order differential equation : linear, non-homogeneous,  
non-constant coefficients

## Example



$$x''(t) + 2c x'(t) + \omega_0^2 x(t) = f(t)$$

equation of harmonic motion

$x(t)$  : displacement of the  
body

Homogeneous equations :

$$x'' + p(t)x' + q(t)x = 0$$

General solution

If  $x_1, x_2$  are linearly independent solutions

$$\Rightarrow x(t) = c_1 x_1(t) + c_2 x_2(t) \quad \text{general solution}$$

Existence / uniqueness

If  $p, q$  are continuous, then

$$x'' + p(t)x' + q(t)x = 0$$

$$x(0) = a, \quad x'(0) = b$$

has a unique solution.