

Séminaire commun  
LVA - École Doctorale MEGA  
Mécanique, Energétique, Génie Civil, Acoustique

## Interesting Examples of Wave Propagation

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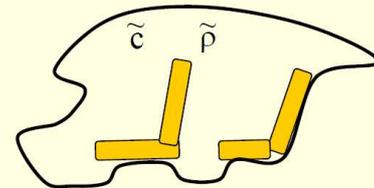
Lundi, 7 Mars 2011 de 11h à 12h.

Amphi Émilie du Châtelet, Bibliothèque Marie Curie - INSA de Lyon  
31 Avenue Jean Capelle, 69621 VILLEURBANNE

### 1. Sound fields with porous material

$$\nabla^2 \varphi_1 + (\omega/c)^2 \varphi_1 = 0$$

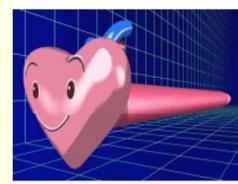
$$\nabla^2 \varphi_2 + (\omega/\tilde{c})^2 \varphi_2 = 0$$



### 2. Pulse wave in blood vessel

$$\rho^* \frac{\partial^2 p}{\partial t^2} - K^* \frac{\partial^2 p}{\partial x^2} = 0$$

$$K^* = \frac{S_i}{C + \frac{S_i}{K_L}} \approx \frac{S_i}{C} = \frac{E(1+j\eta)}{2(1+\nu)} \cdot \frac{R_0^2 - R_i^2}{R_i^2(1-2\nu) + R_0^2}$$



flexible wall  
or rigid wall

### 3. Suppression of free vibration for time varying system

$$\frac{d(J\dot{\theta})}{dt} + k(\theta - \theta_0) = 0$$



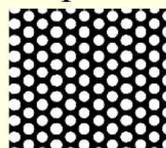
### 4. Bending wave along the long cable

$$EI \frac{\partial^4 w}{\partial x^4} + \rho A \frac{\partial^2 w}{\partial t^2} = 0, \quad EI \frac{\partial^4 w}{\partial x^4} + \rho A \frac{\partial^2 w}{\partial t^2} = T \frac{\partial^2 w}{\partial x^2}$$



### 5. Sound fields with perforated panel

$$\frac{\partial^2 \phi}{\partial t^2} = c^2 \frac{\partial^2 \phi}{\partial x^2}$$



$$\Delta p = \frac{1}{2} \zeta \rho \dot{x} |\dot{x}| \delta(a)$$

Perforated panel