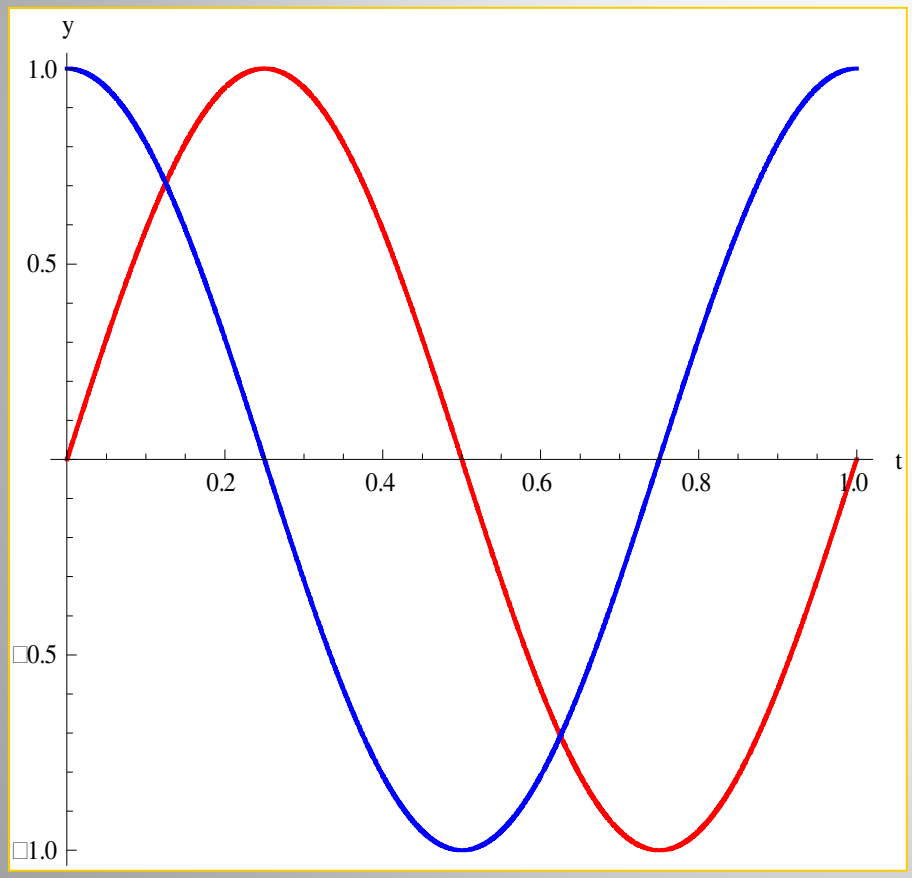
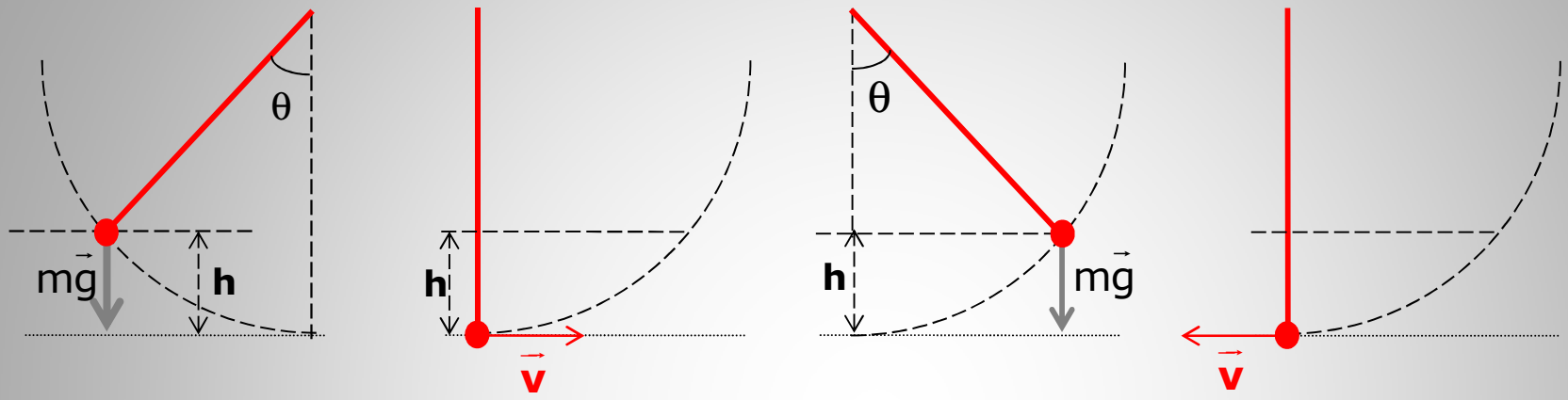
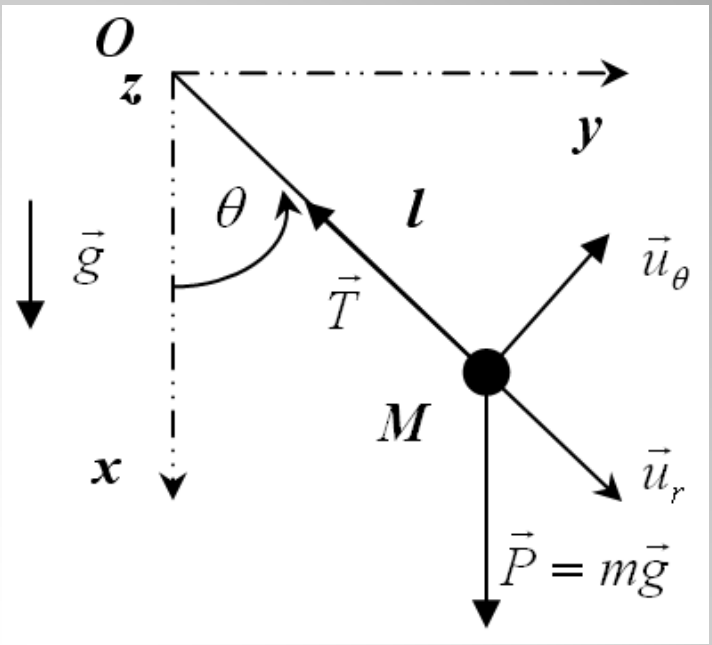
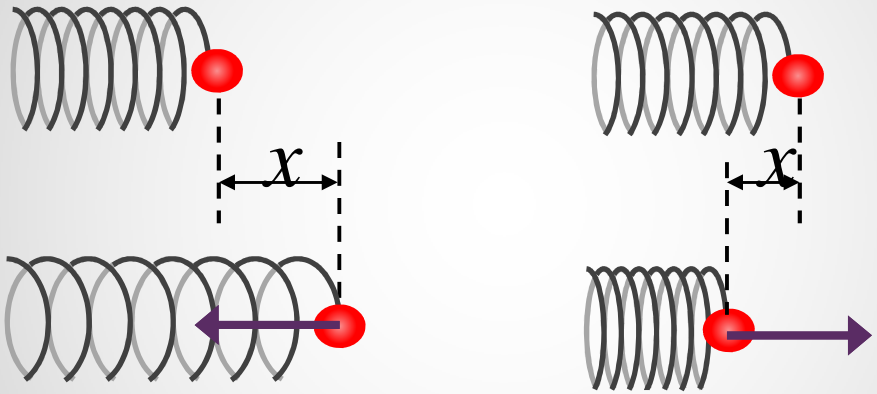
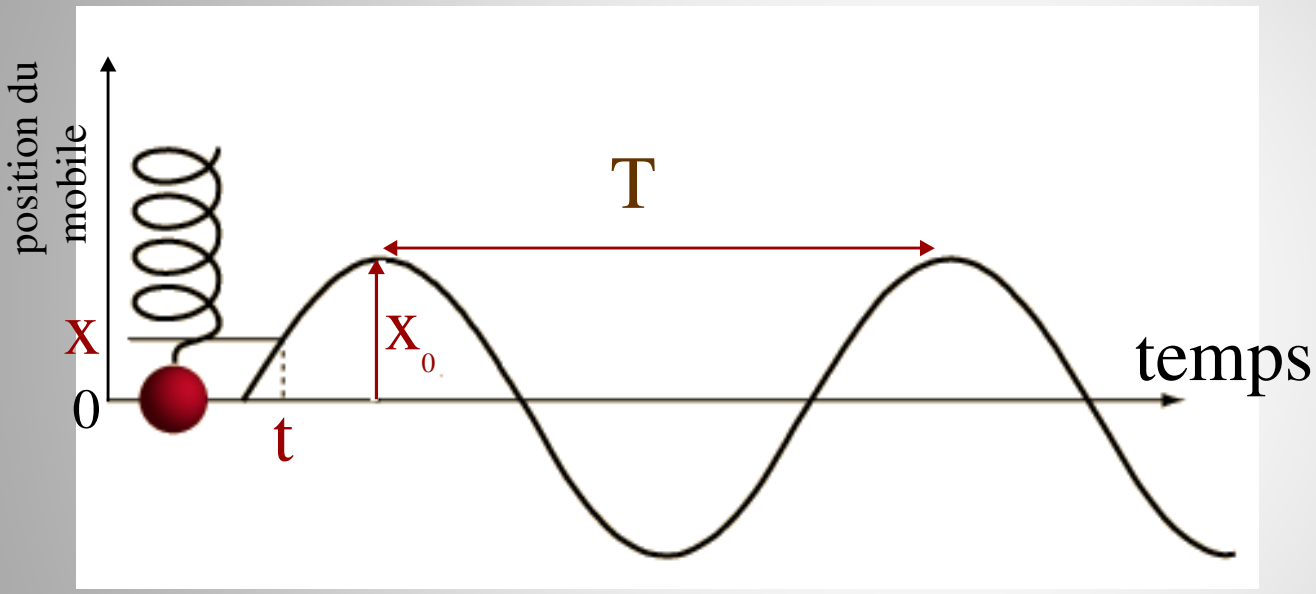
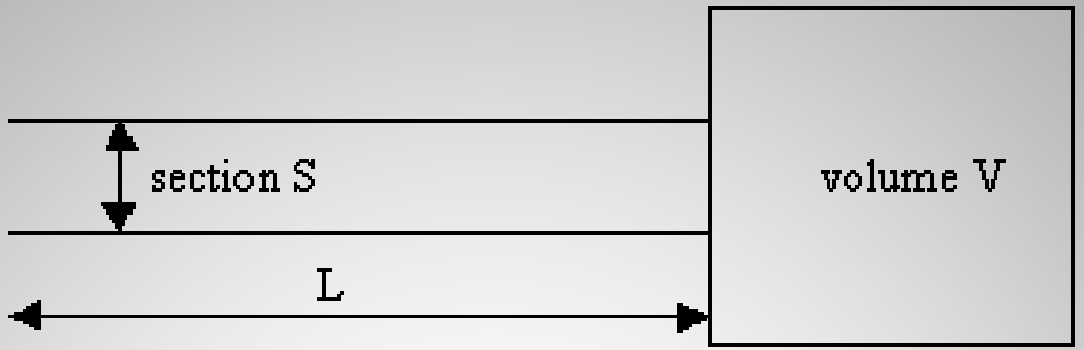

y
1.0
0.5
0.2
0.4
0.6
0.8
1.0
t
□0.5
□1.0

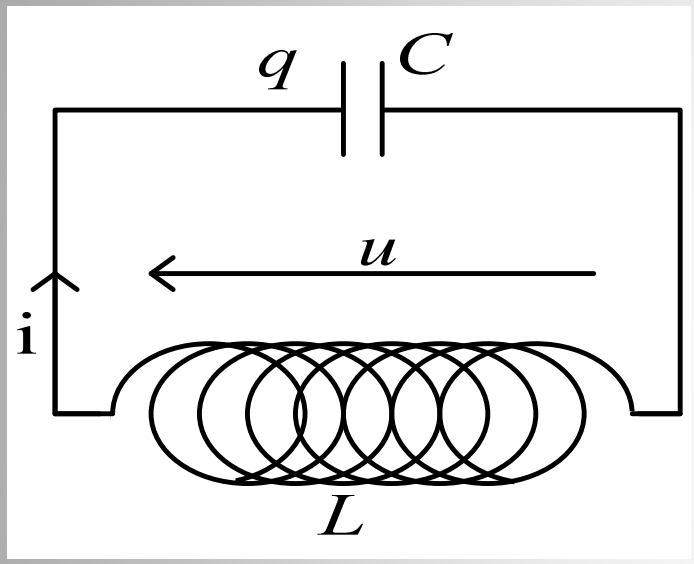

θ
mg
h
h
v
θ
h
mg
v

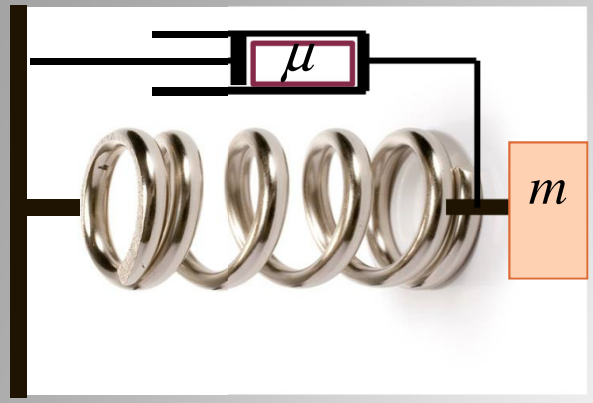

O
z
y
θ
l
$\vec{g}$
$\vec{T}$
$\vec{u}_\theta$
M
x
$\vec{u}_r$
$\vec{P} = m\vec{g}$

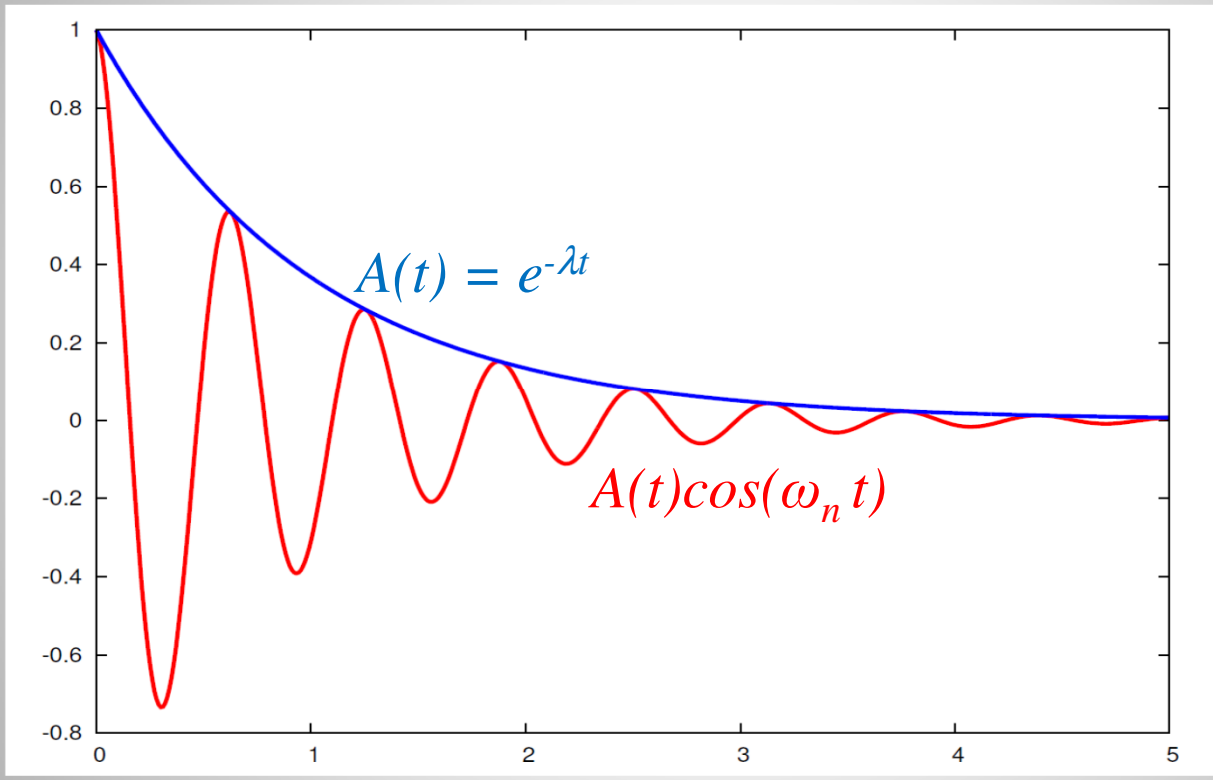

x
x

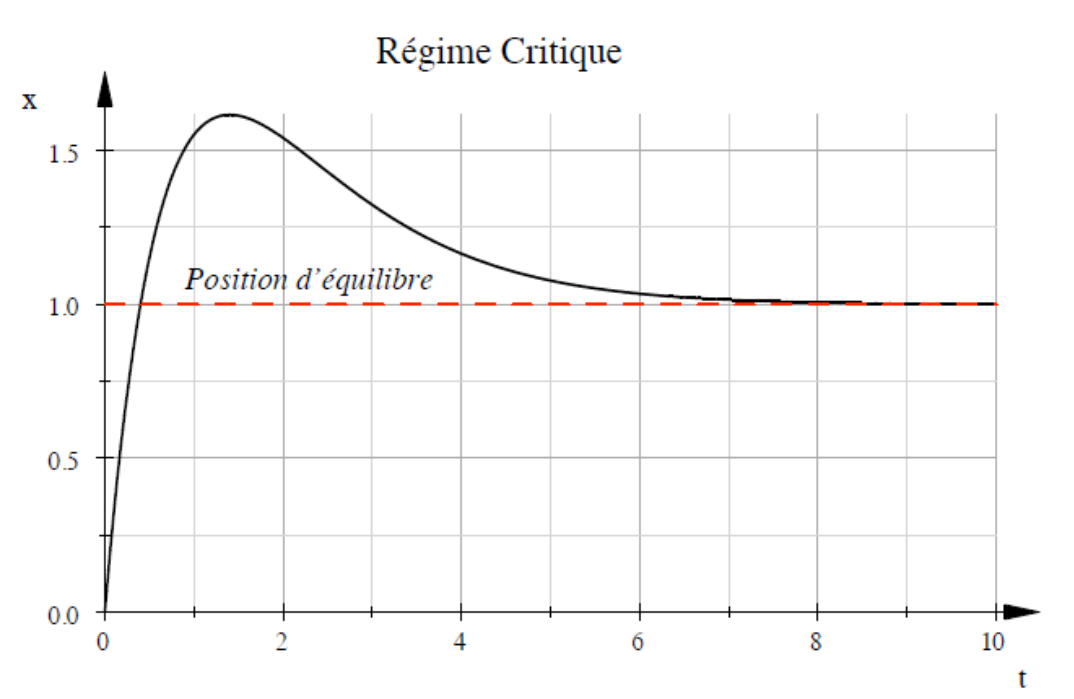

position du mobile
x
0
t
T
x_0
temps

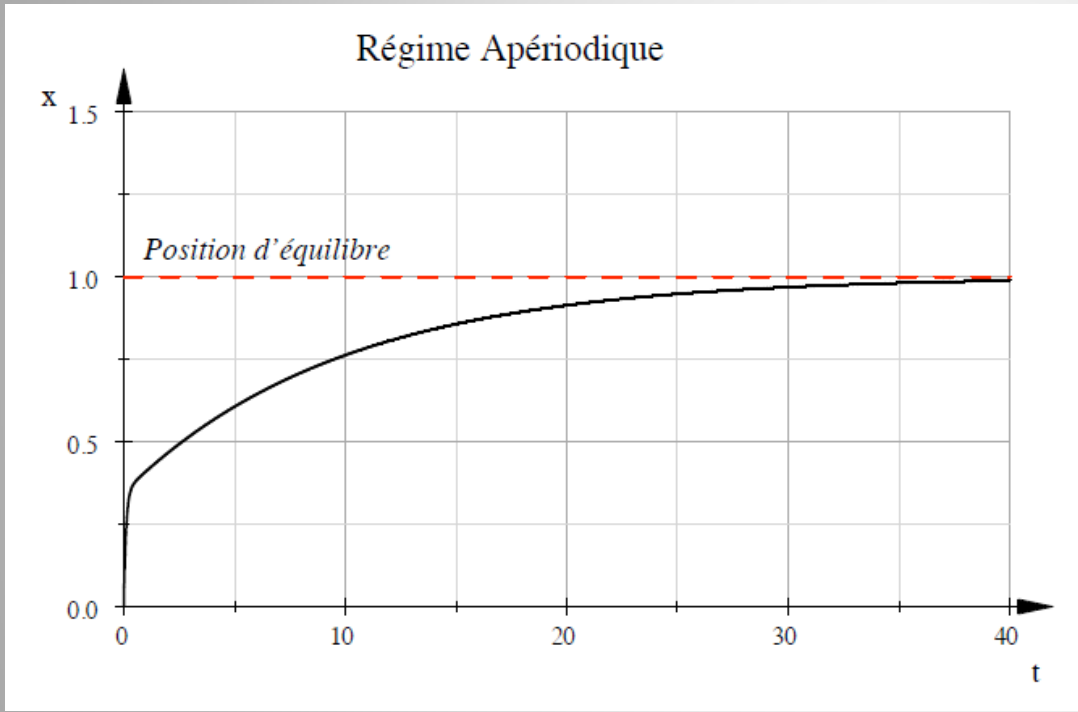

section S
volume V
L

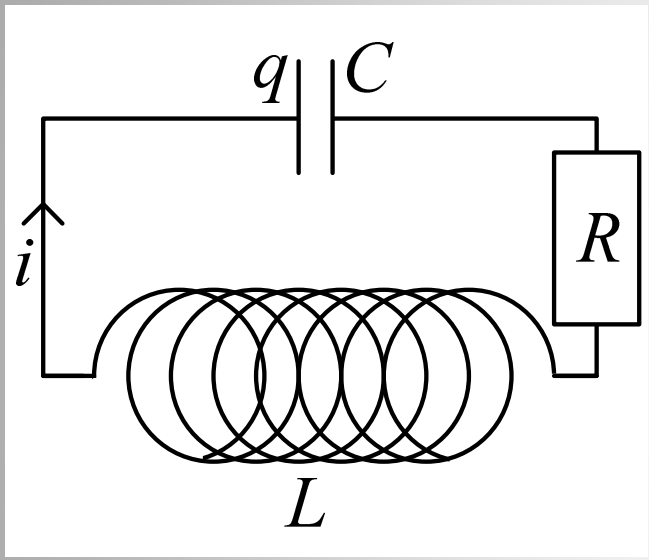

q
C
u
i
L

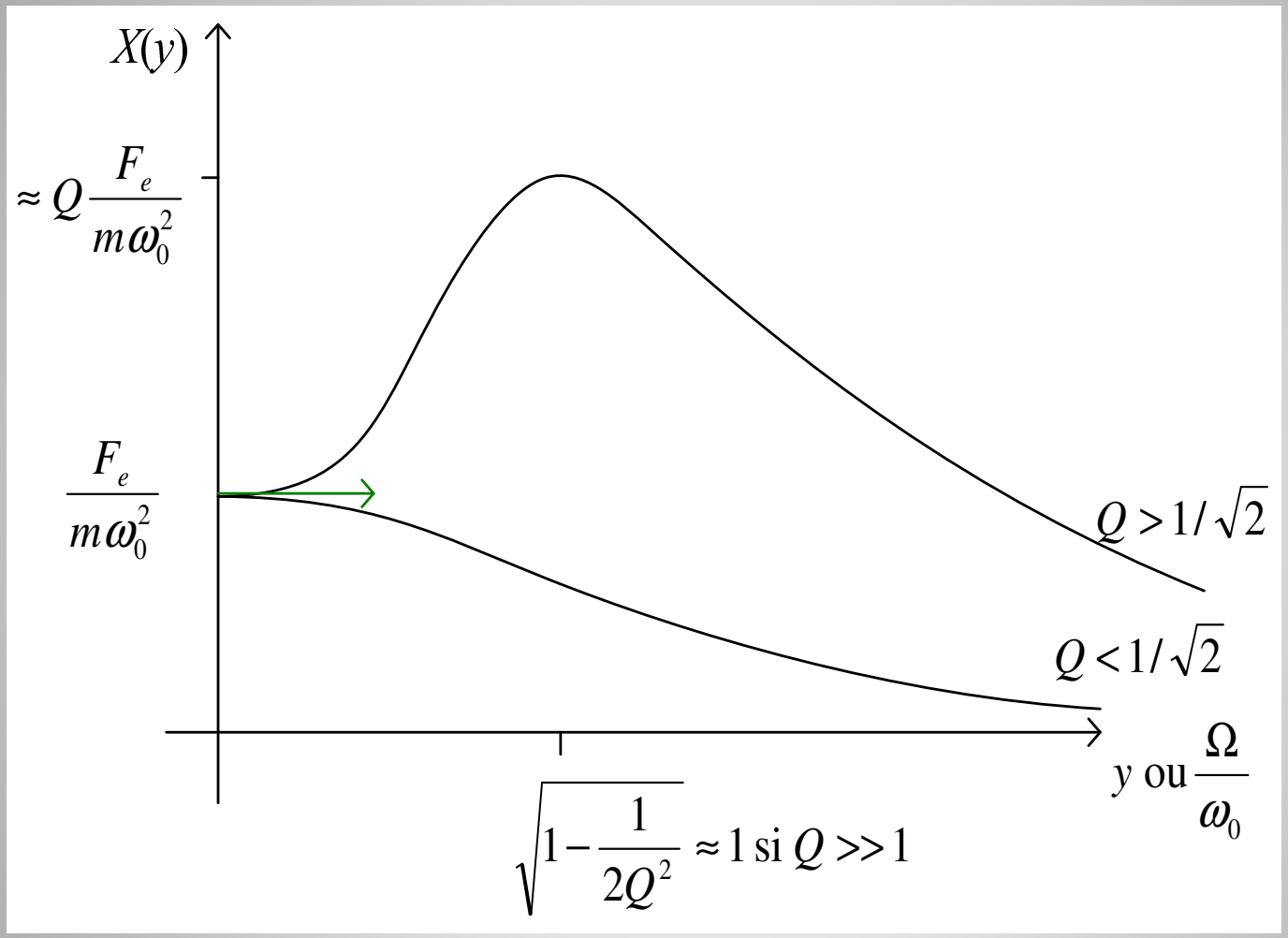

μ
m

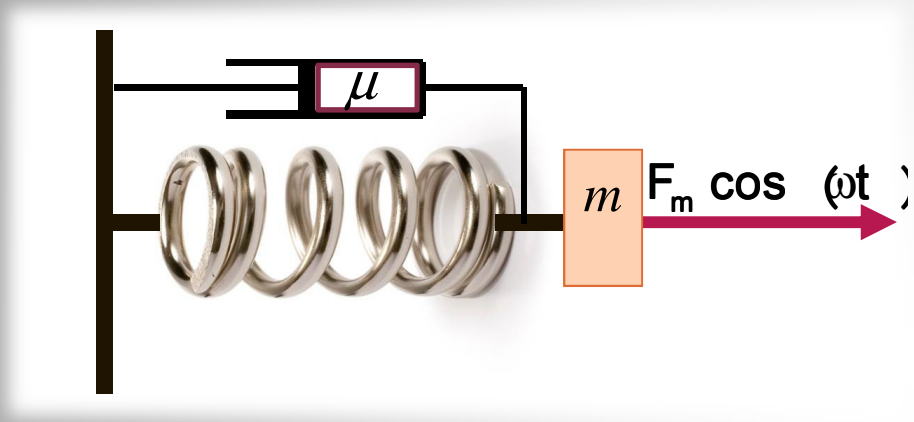

1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
0
1
2
3
4
5
$A(t) = e^{-\lambda t}$
$A(t)cos(\omega_n t)$

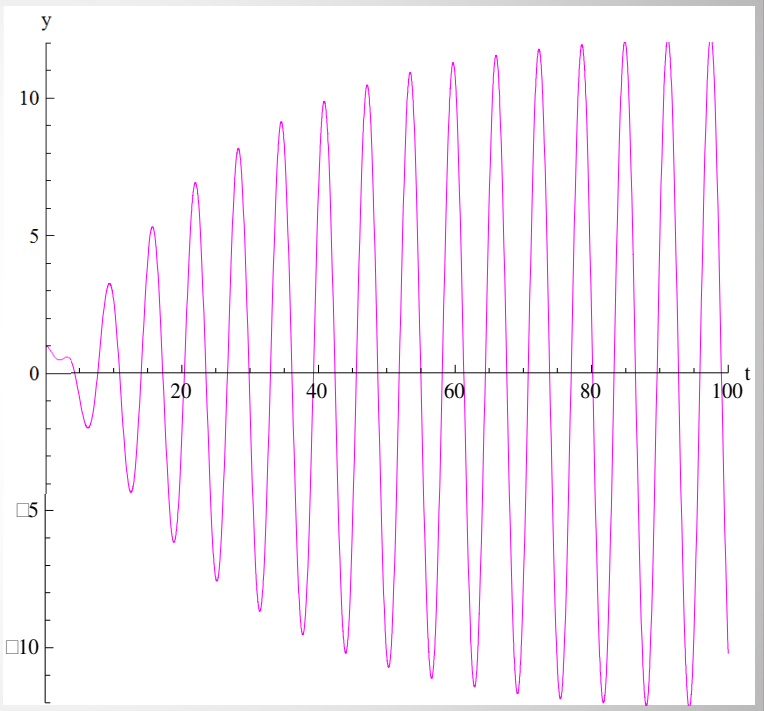

Régime Critique
x
1.5
1.0
0.5
0.0
Position d'équilibre
0
2
4
6
8
10
t

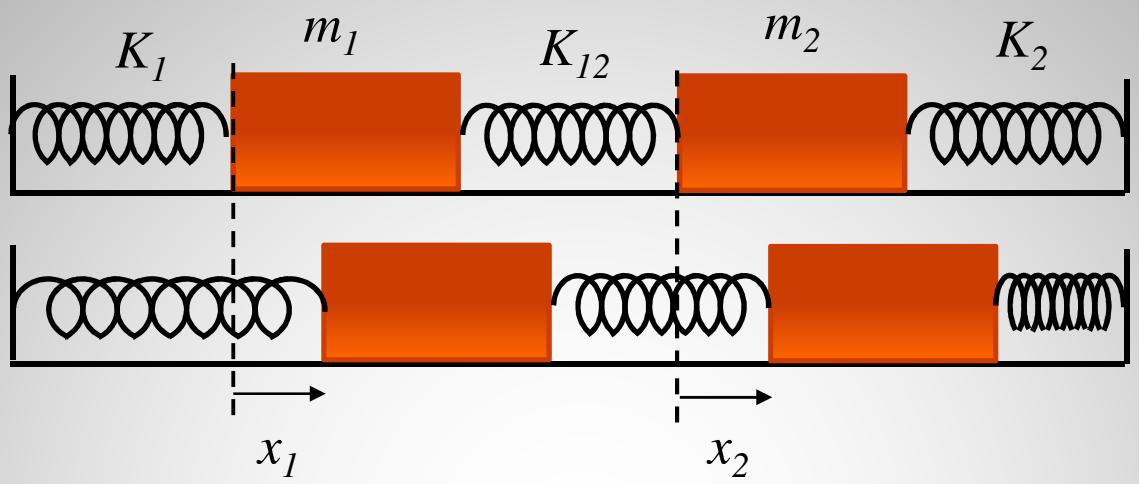

Régime Apériodique
x
1.5
1.0
0.5
0.0
Position d'équilibre
0
10
20
30
40
t

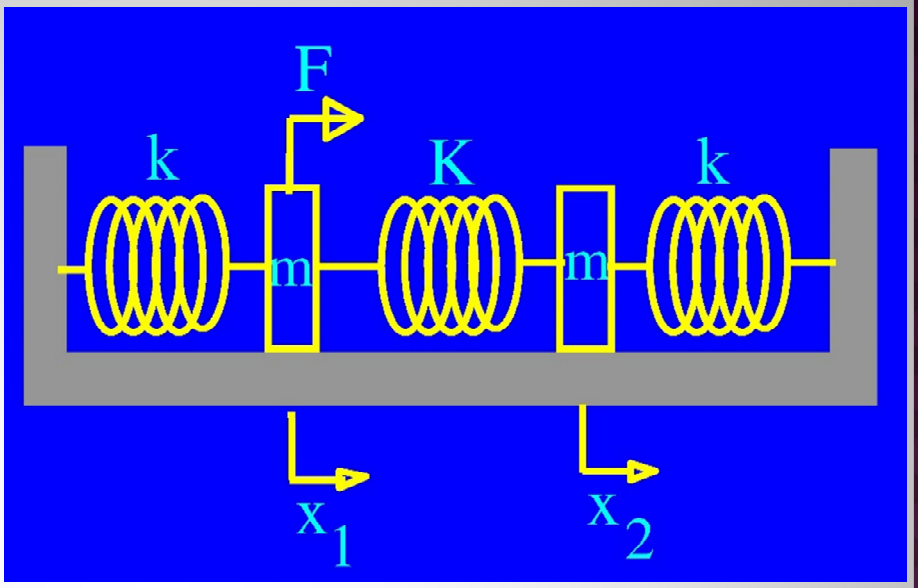

q
C
R
i
L

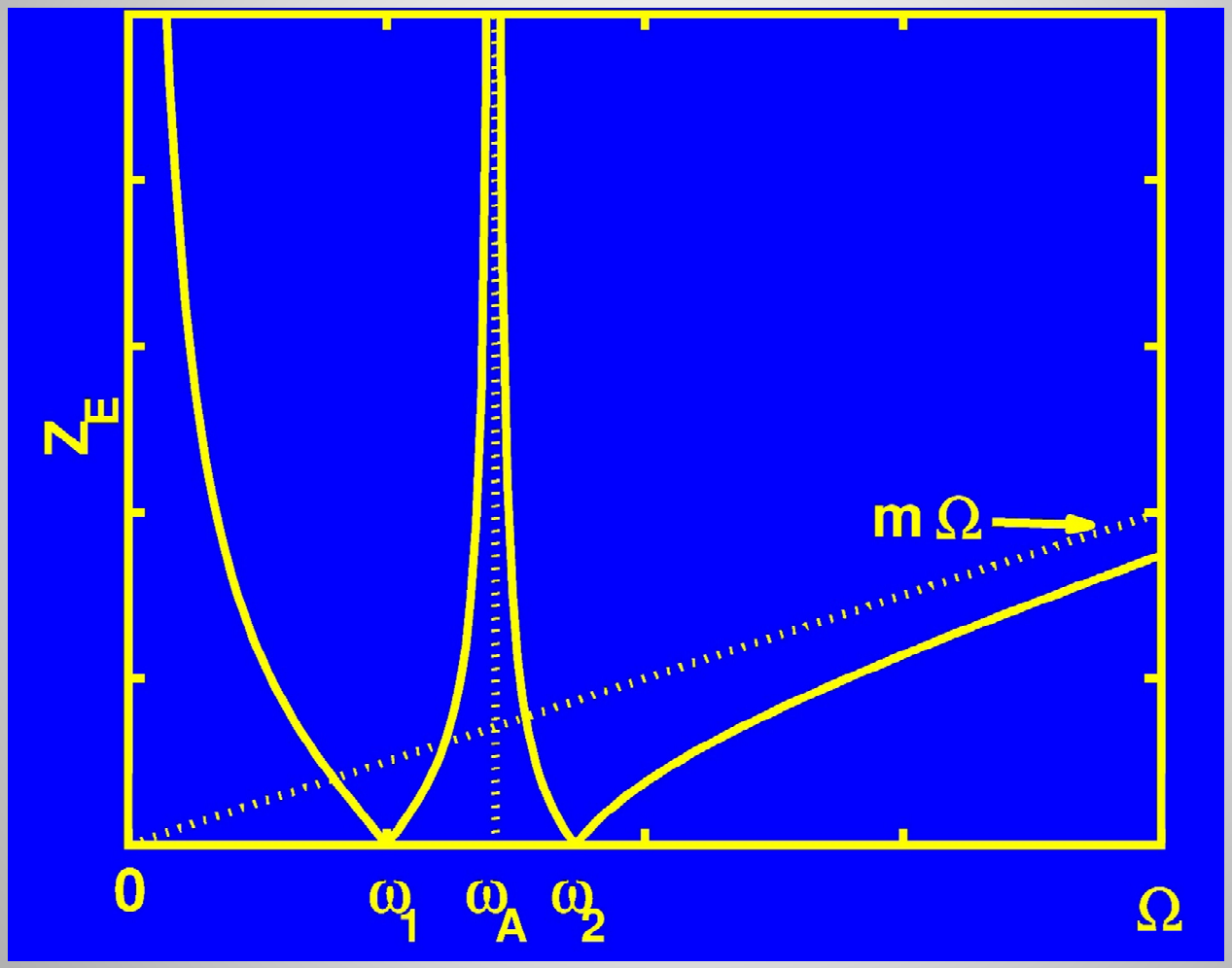

$X(y)$
$\approx Q\dfrac{F_e}{m\omega_0^2}$
$\dfrac{F_e}{m\omega_0^2}$
$Q > 1/\sqrt{2}$
$Q < 1/\sqrt{2}$
y ou $\dfrac{\Omega}{\omega_0}$
$\sqrt{1-\dfrac{1}{2Q^2}} \approx 1$ si $Q >> 1$

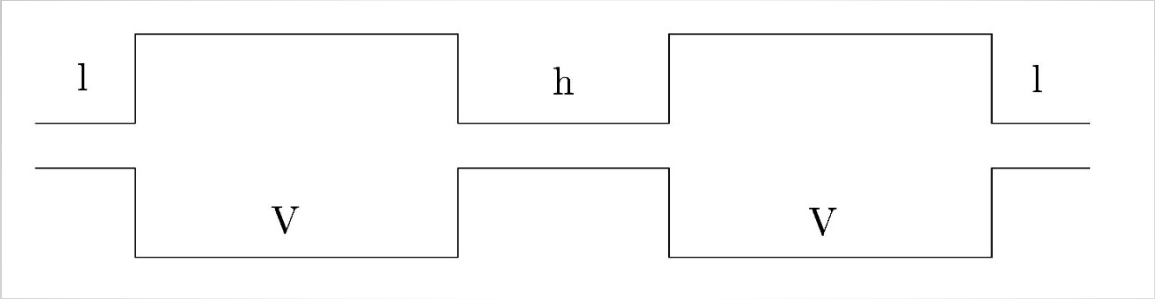

μ
m
F_m cos (ωt

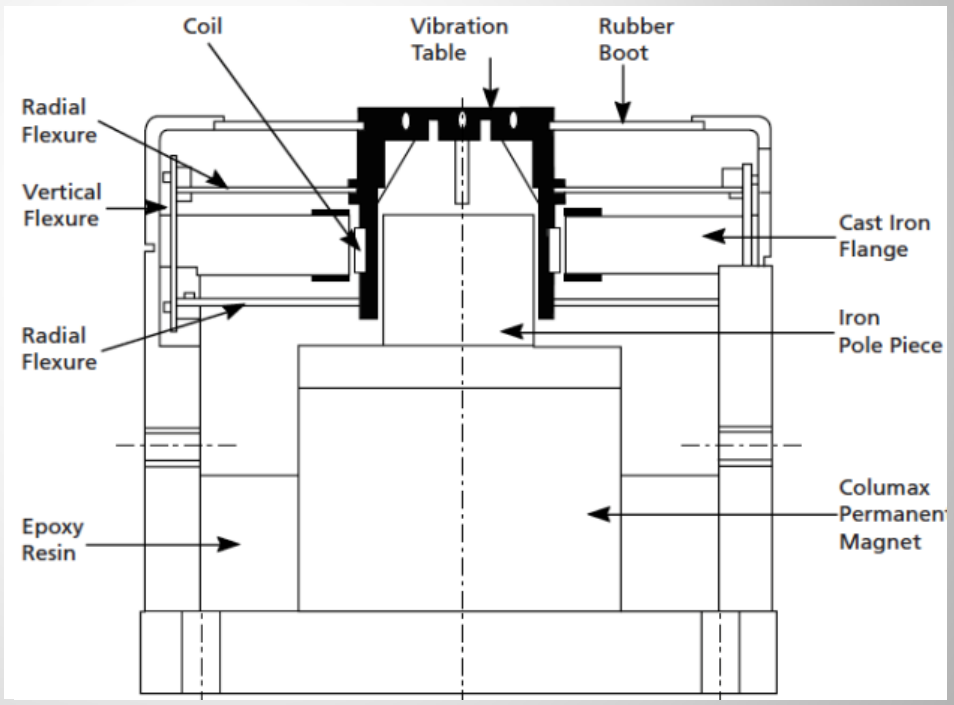

y
10
5
0
□5
□10
20
40
60
80
100
t

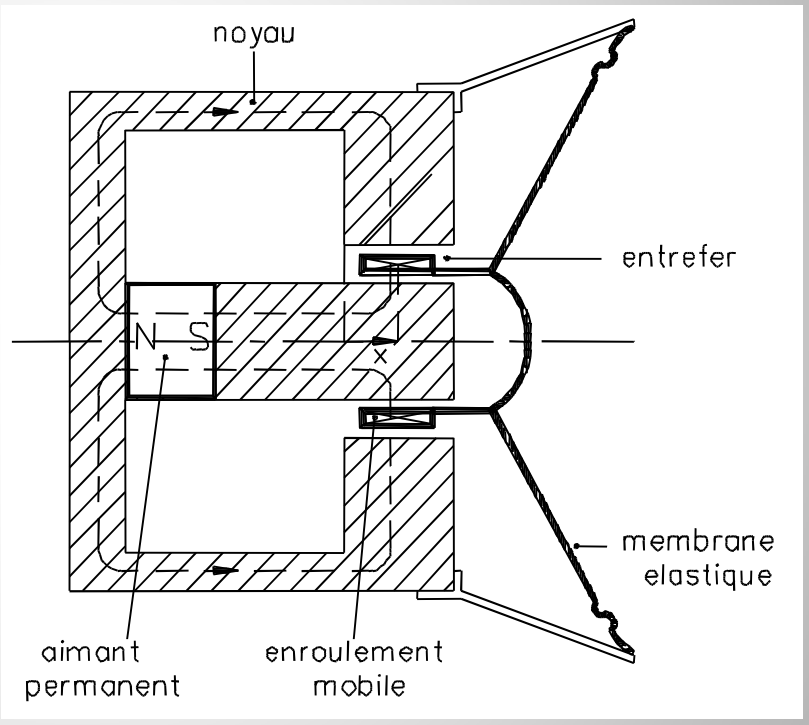

K_1
m_1
K_{12}
m_2
K_2
x_1
x_2


F
k
K
k
m
m
x1
x2

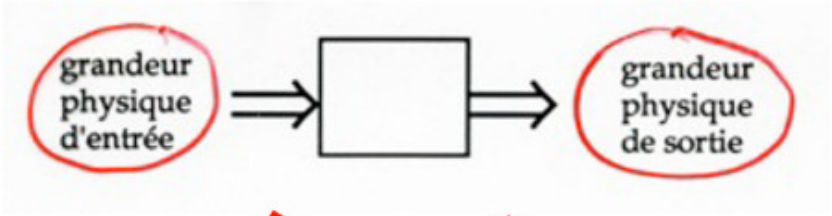

Z_E
$m\Omega$
0
ω_1
ω_A
ω_2
Ω


l
h
l
V
V


Coil
Vibration Table
Rubber Boot
Radial Flexure
Vertical Flexure
Radial Flexure
Epoxy Resin
Cast Iron Flange
Iron Pole Piece
Columax Permanen
Magnet

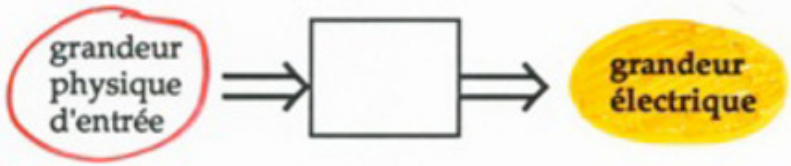

noyau
entrefer
N
S
x
membrane
elastique
aimant
permanent
enroulement
mobile

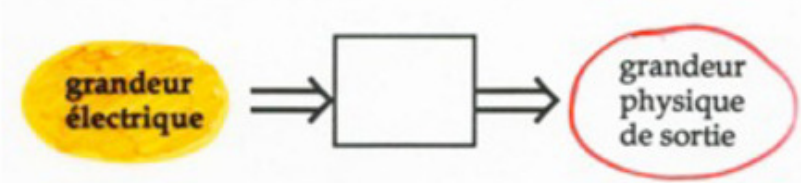
On appellera **transducteurs** un composant qui fournit comme signal de sortie une grandeur physique utilisable en réponse à une autre grandeur physique spécifiée comme signal d'entrée :

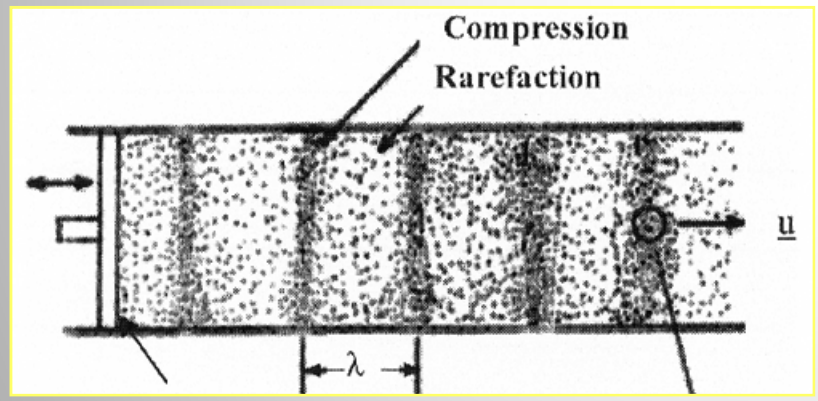


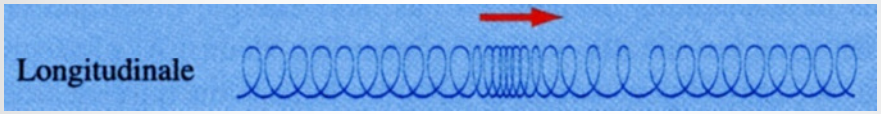
- **les capteurs, senseurs ou détecteurs** qui fournissent comme signal de sortie une quantité électrique utilisable en réponse à une grandeur, une propriété ou une condition physique à mesurer

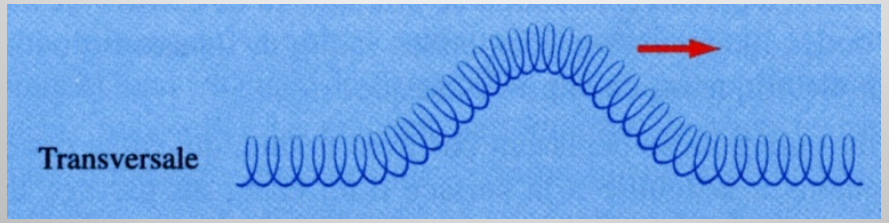
- **les actuateurs, moteurs ou générateurs** qui fournissent comme signal de sortie une grandeur ou une condition physique à modifier en réponse à une quantité électrique fournie à l'entrée.

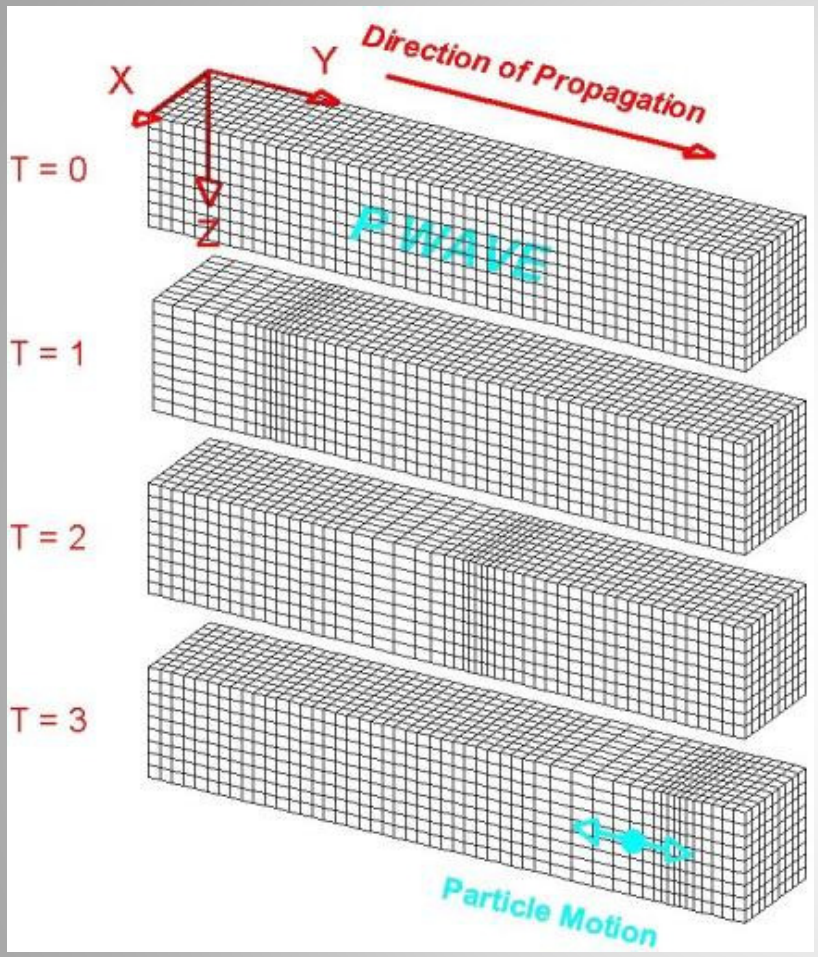


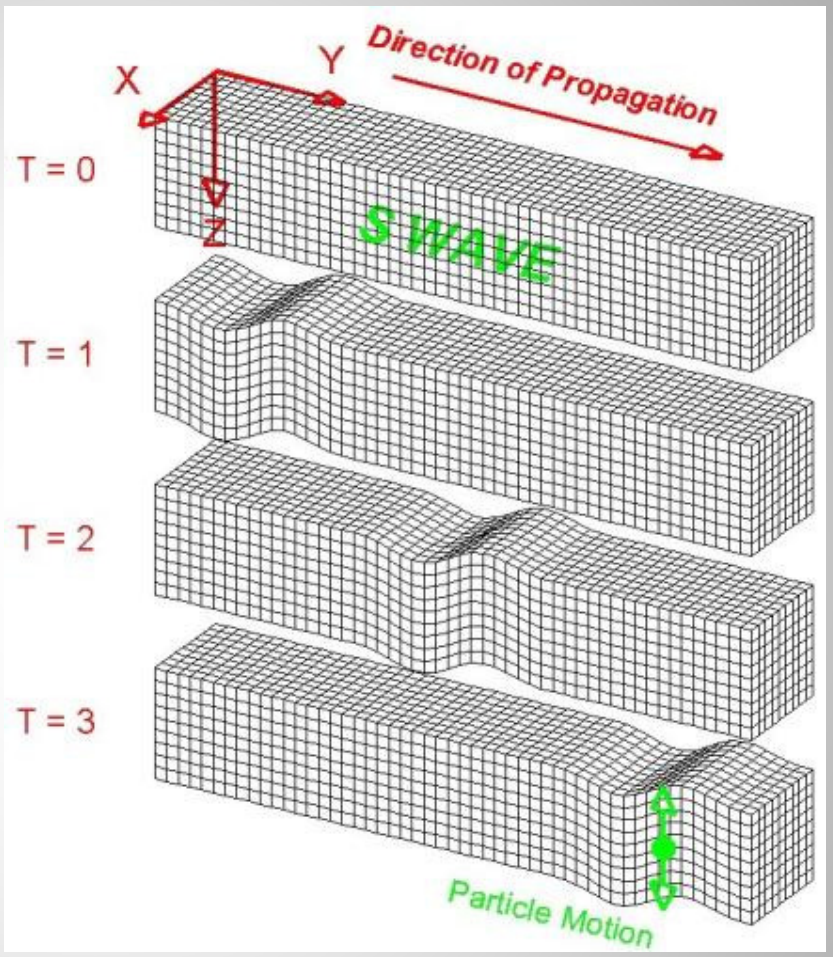



Compression
Rarefaction
u
λ

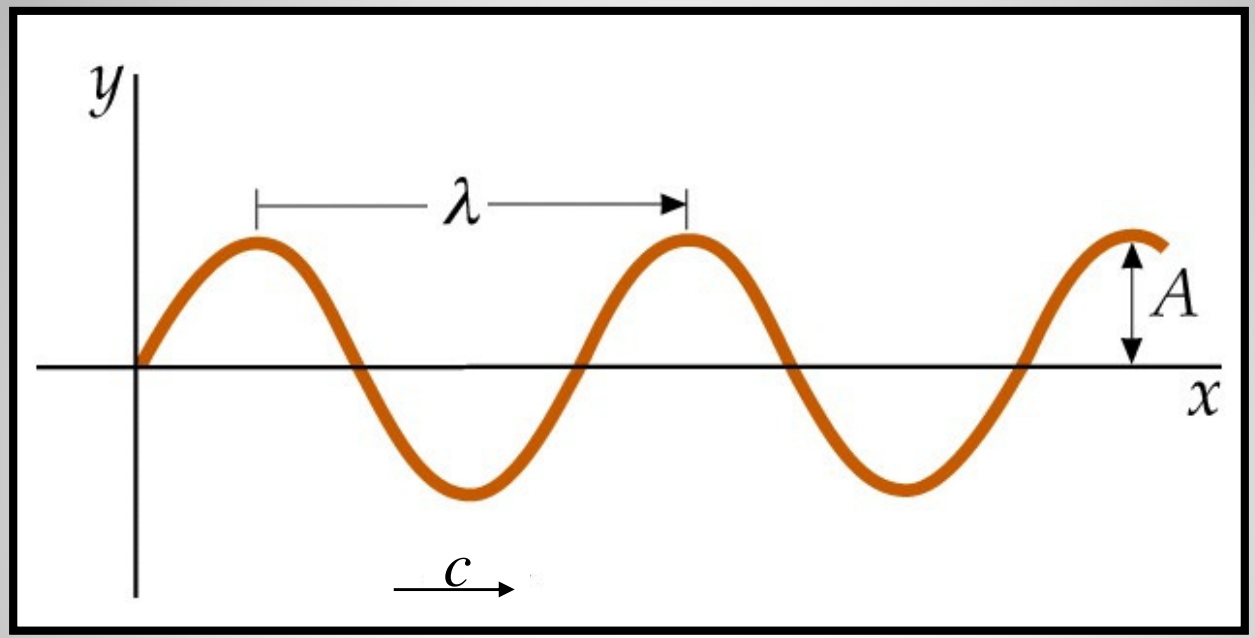

Longitudinale

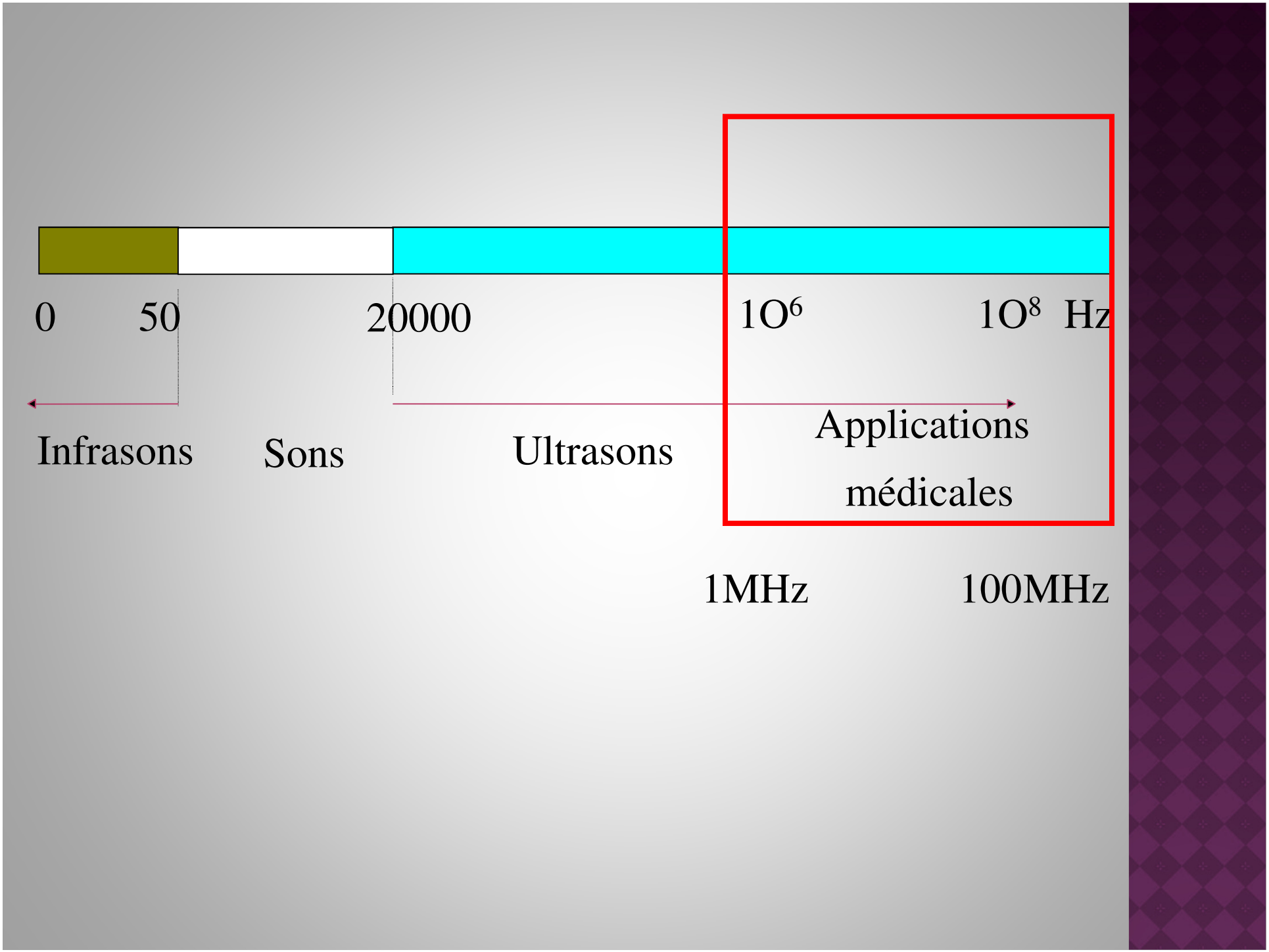

Transversale

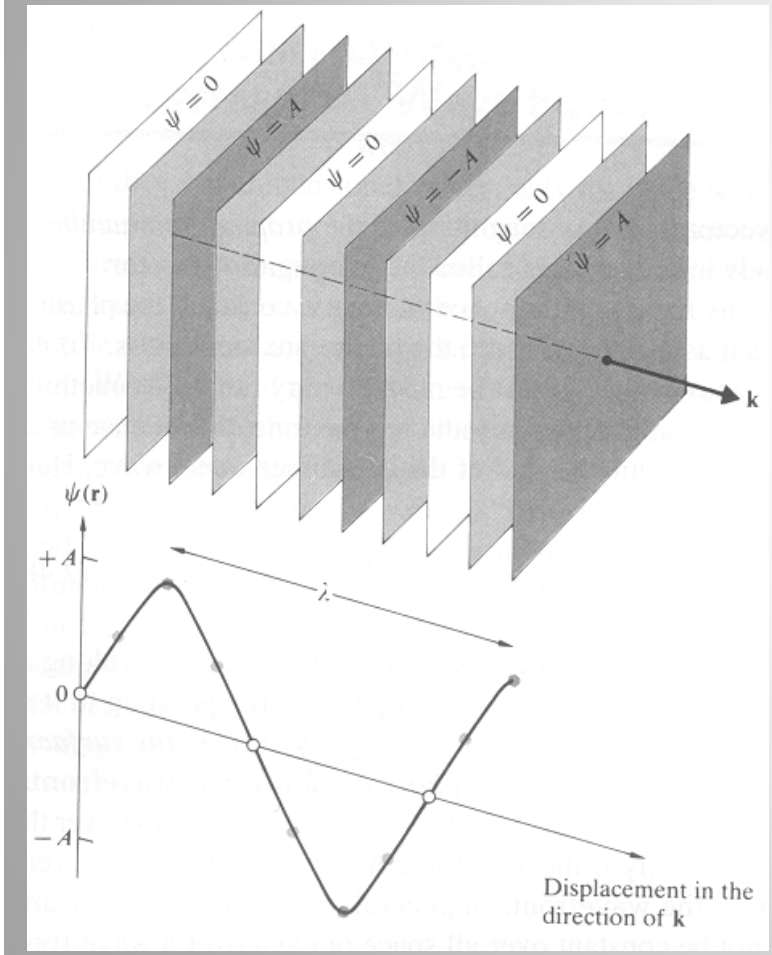

X
Y
Z
Direction of Propagation
T = 0
T = 1
T = 2
T = 3
P WAVE
Particle Motion

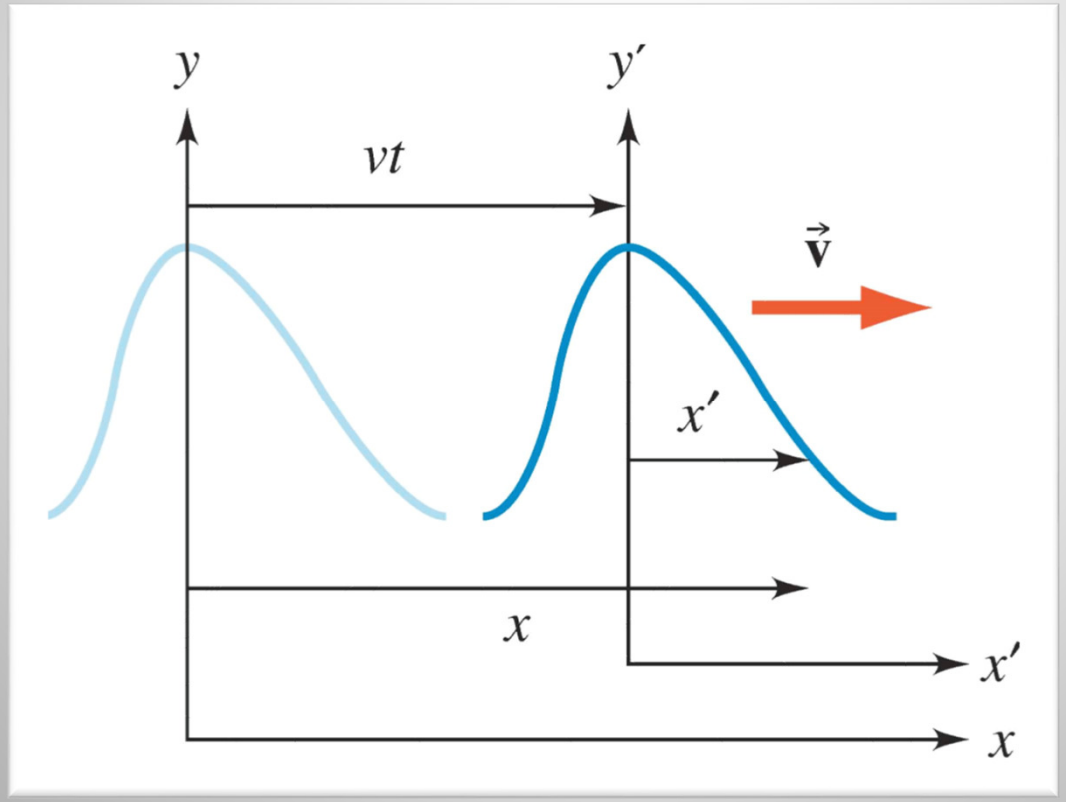

X
Y
Z
Direction of Propagation
T = 0
T = 1
T = 2
T = 3
S WAVE
Particle Motion

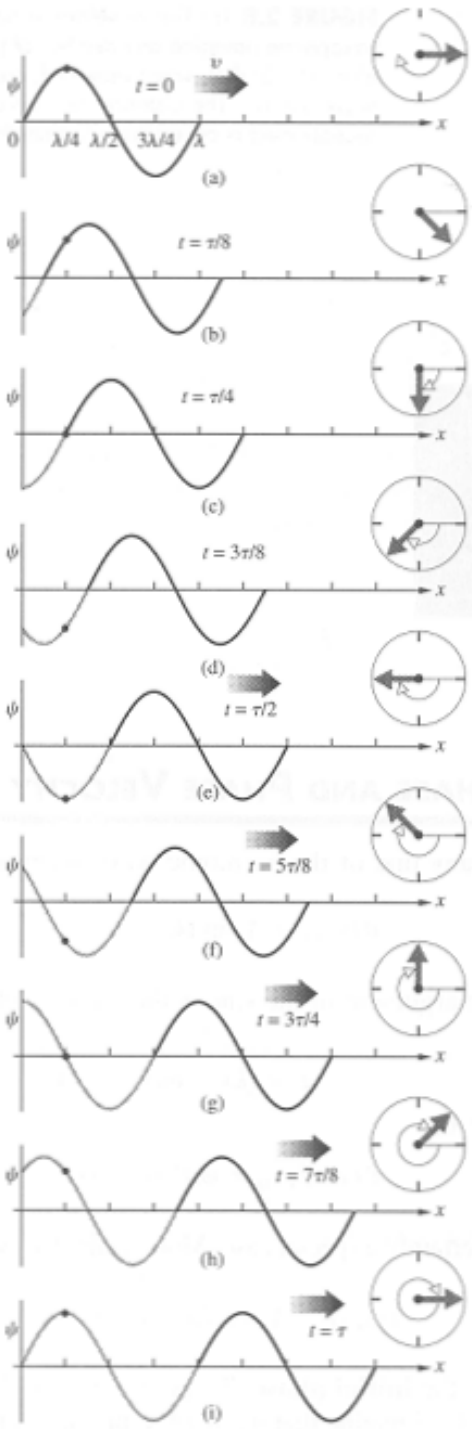
Milieu	Vitesse (m s^{-1})
Air	330
eau	1480
Tissus mous	1540
os	4080

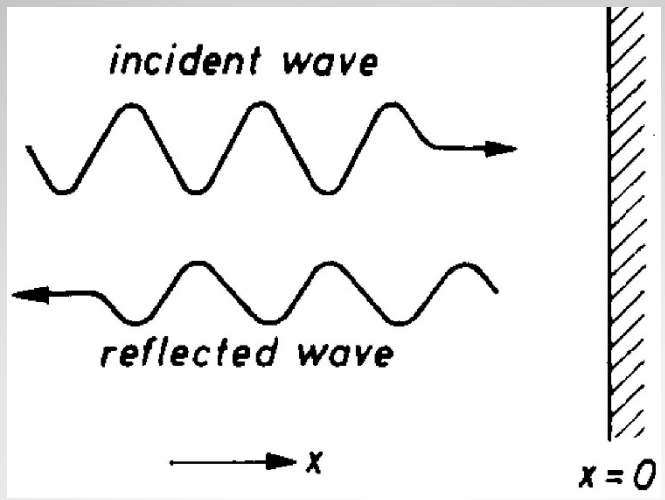

y
λ
A
x
c

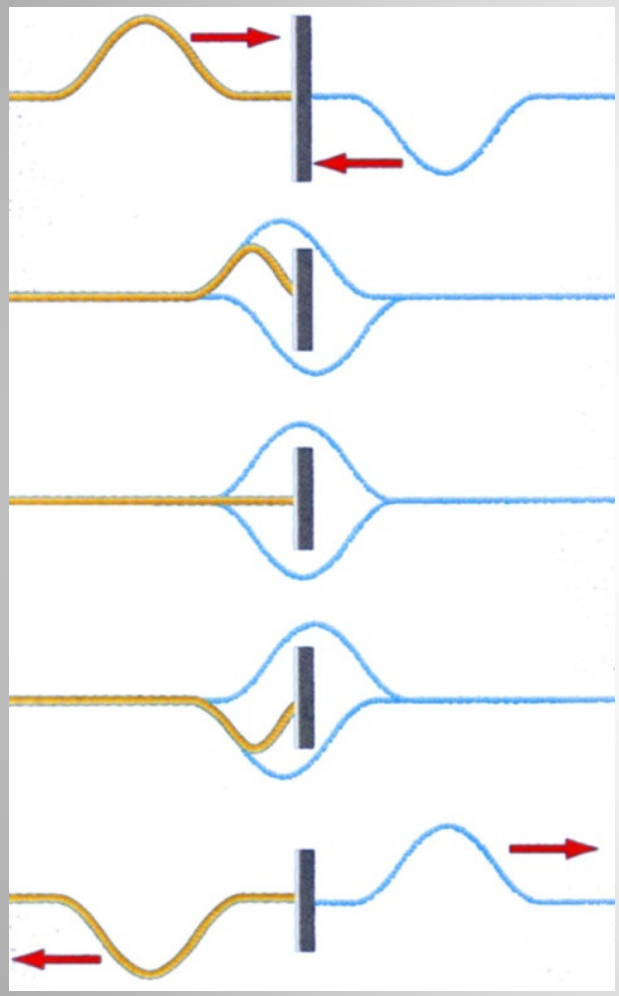

0
50
20000
1O6
1O8
Hz
Infrasons
Sons
Ultrasons
Applications
médicales
1MHz
100MHz

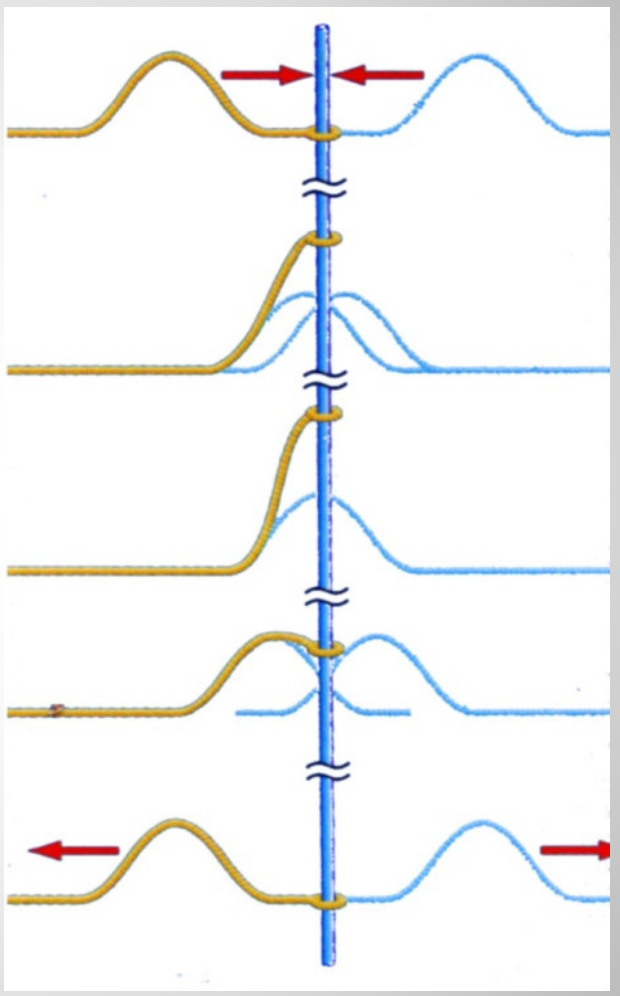

ψ = 0
ψ = A
ψ = 0
ψ = −A
ψ = 0
ψ = A
k
ψ(r)
+A
λ
0
−A
Displacement in the direction of k

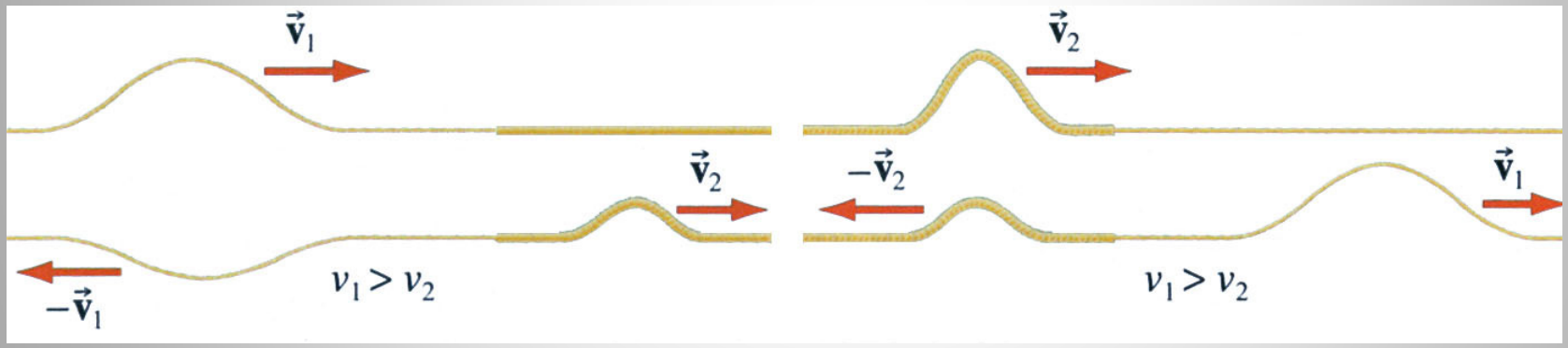

y
y′
vt
v
x′
x
x′
x

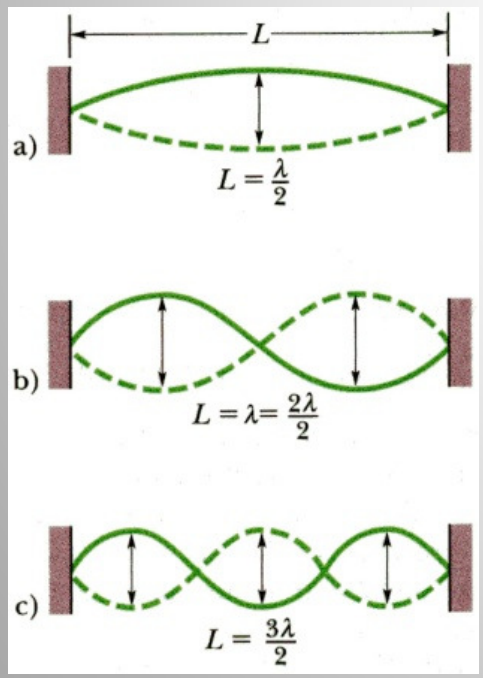

t = 0
v
0
λ/4
λ/2
3λ/4
λ
x
ψ
(a)
t = τ/8
(b)
t = τ/4
(c)
t = 3τ/8
(d)
t = τ/2
(e)
t = 5τ/8
(f)
t = 3τ/4
(g)
t = 7τ/8
(h)
t = τ
(i)


incident wave
reflected wave
x
x = 0

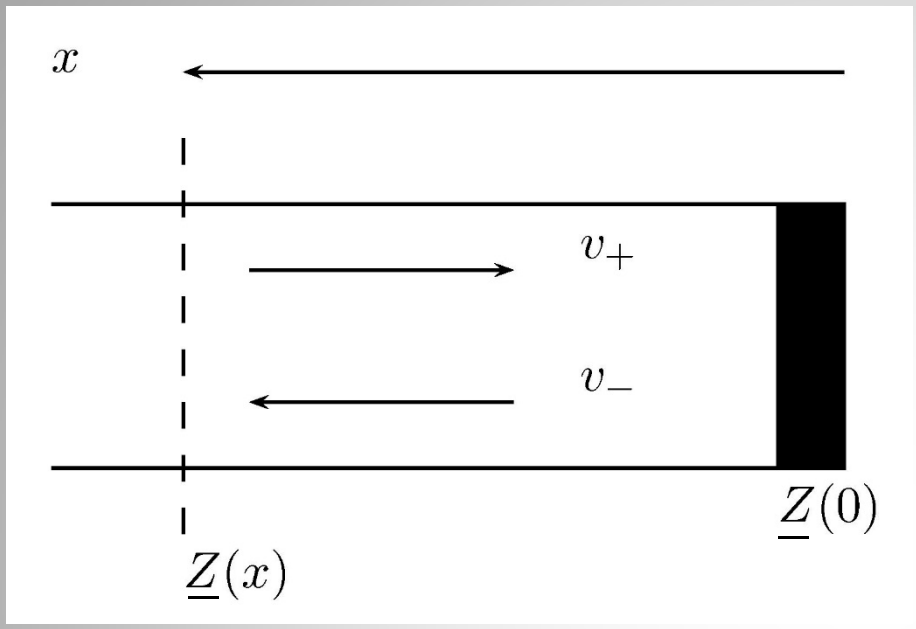


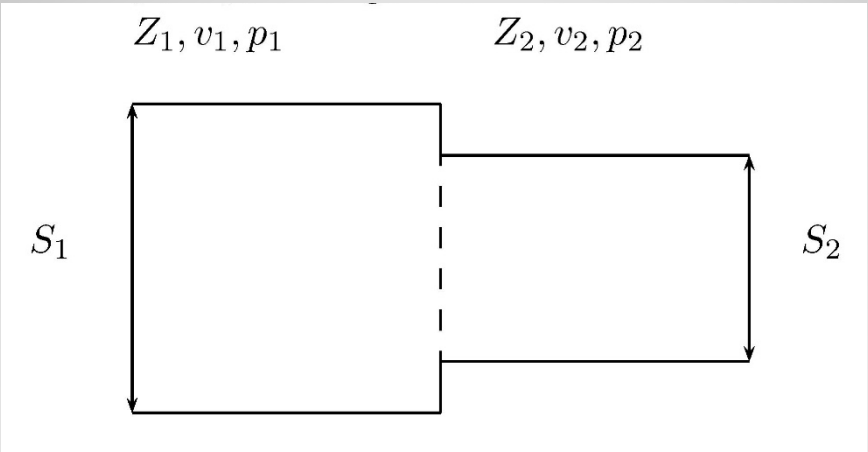


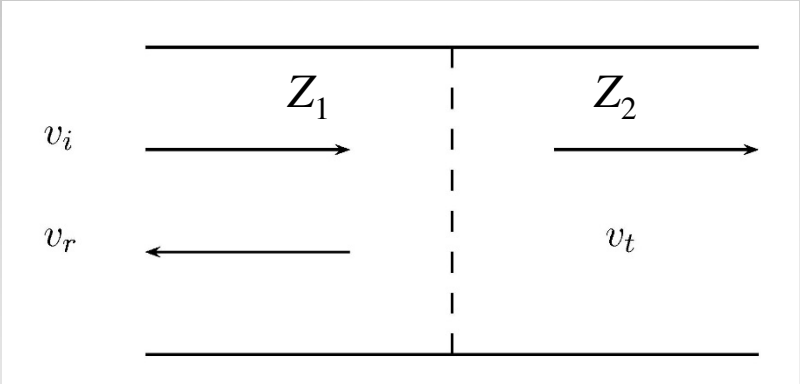

$\vec{v}_1$
$\vec{v}_2$
$-\vec{v}_1$
$v_1 > v_2$
$\vec{v}_2$
$-\vec{v}_2$
$\vec{v}_1$
$v_1 > v_2$

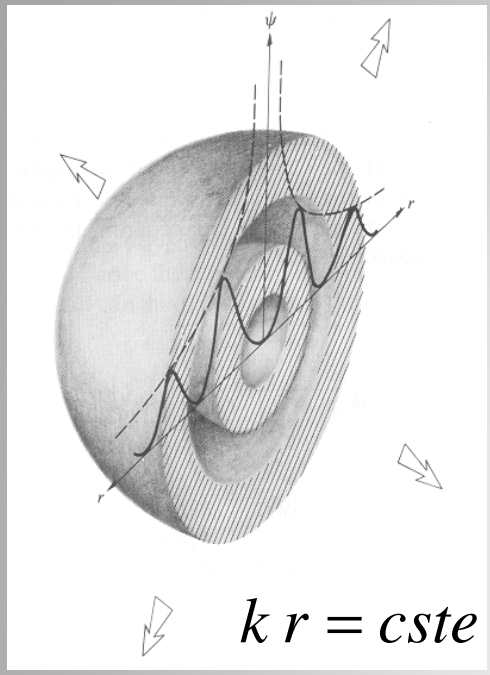

L
a)
$L = \frac{\lambda}{2}$
b)
$L = \lambda = \frac{2\lambda}{2}$
c)
$L = \frac{3\lambda}{2}$

z (en kg/(m^{2}s) ou rayl)	
air	4×10^{-10}
aluminium	$1{,}7 \times 10^{-5}$
cerveau	$1{,}58 \times 10^{-6}$
eau	$1{,}48 \times 10^{-6}$
graisse	$1{,}38 \times 10^{-6}$
muscle	$1{,}70 \times 10^{-6}$
os	$7{,}80 \times 10^{-6}$
peau	$1{,}62 \times 10^{-6}$
sang	$1{,}61 \times 10^{-6}$
tissus mou	$1{,}63 \times 10^{-6}$


x
v_+
v_-
$\underline{Z}(0)$
$\underline{Z}(x)$

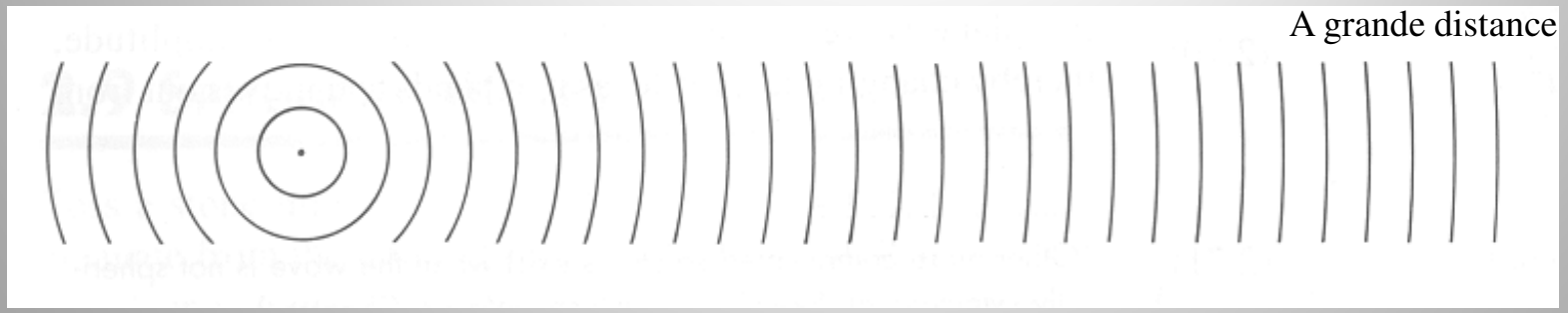

Z_1, v_1, p_1
Z_2, v_2, p_2
S_1
S_2

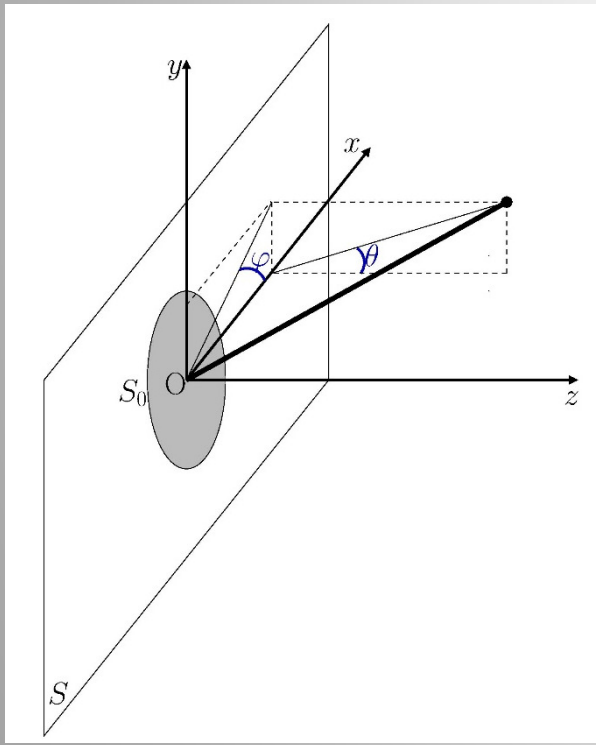

Z_1
Z_2
v_i
v_r
v_t

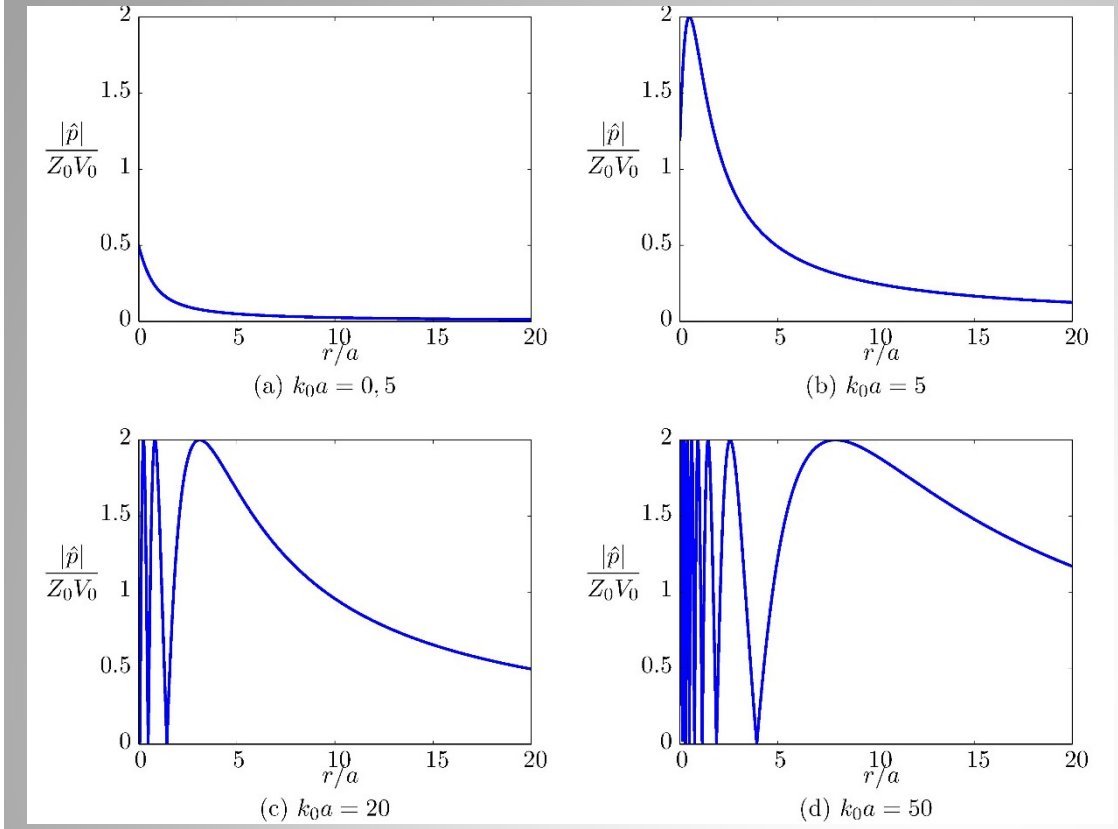


$$k\,r = cste$$

A grande distance




y
x
φ
θ
S_0
O
z
S



(a) $k_0 a = 0,5$ (b) $k_0 a = 5$

(c) $k_0 a = 20$ (d) $k_0 a = 50$