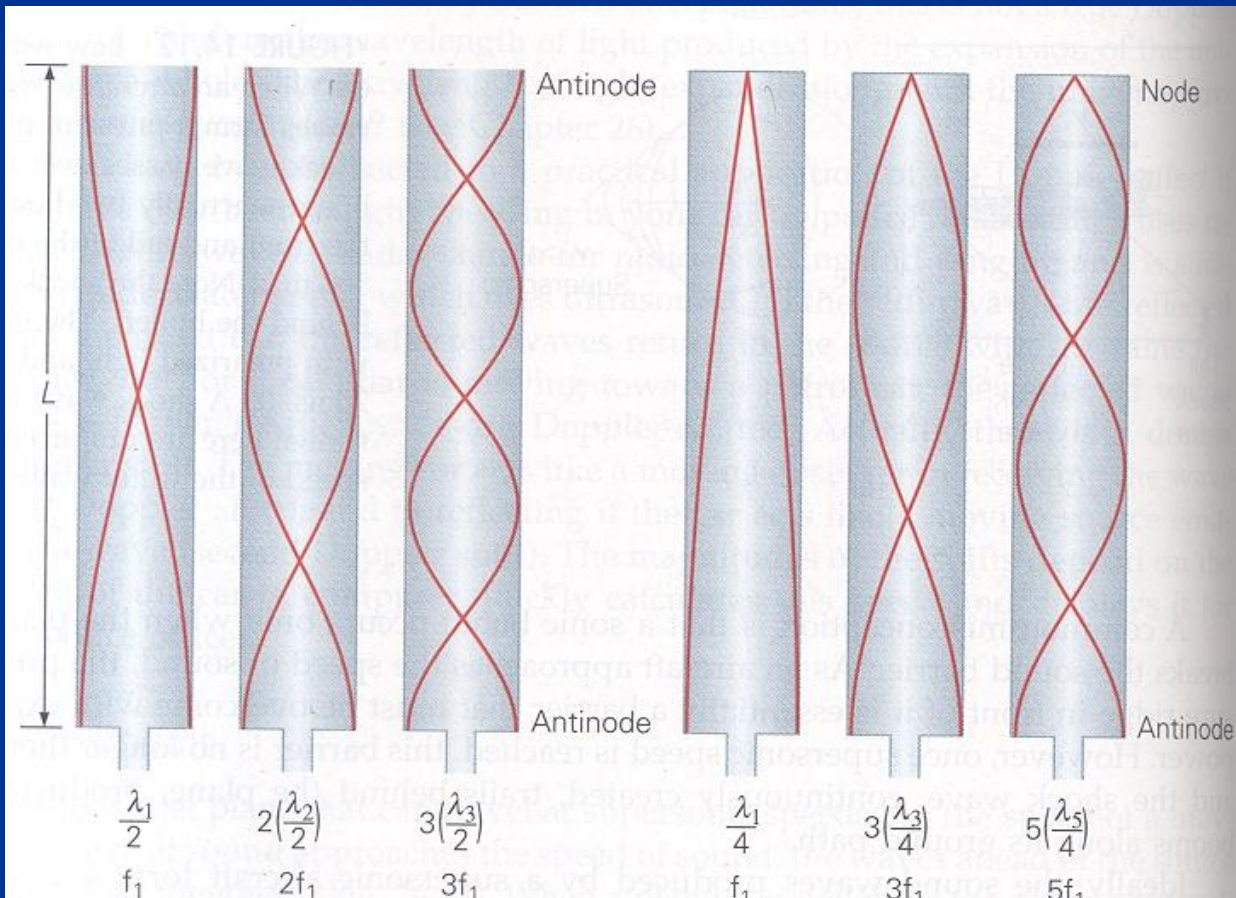


Cavidades ressonantes

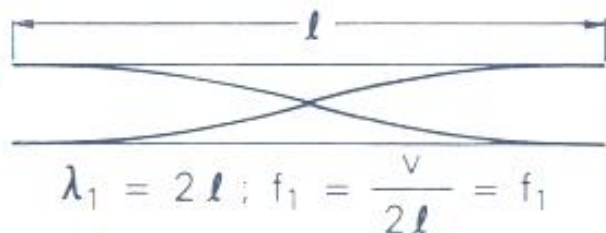
- Tubos fechados
- Tubos abertos
- Caixas de ressonância



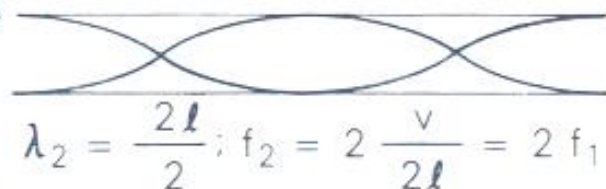
Tubo aberto



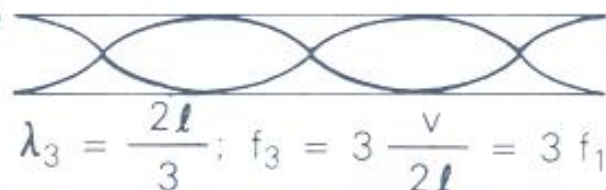
1.º Modo de vibrar



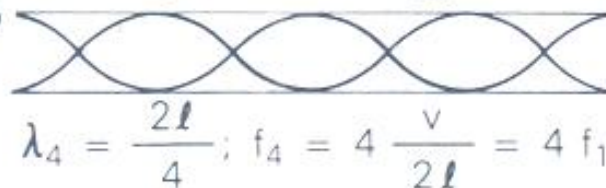
2.º Modo de vibrar



3.º Modo de vibrar

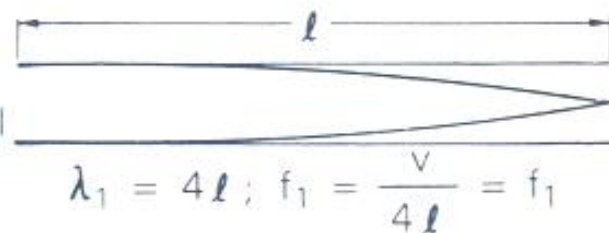


4.º Modo de vibrar

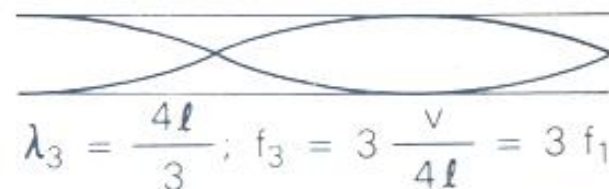


Som Fundamental

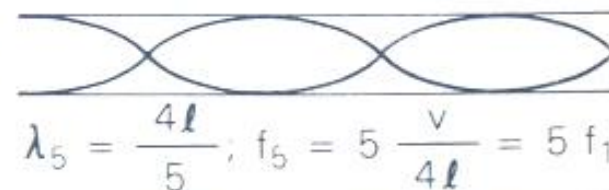
Tubo fechado



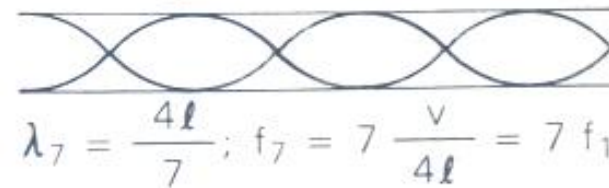
Harmônico 2.º 3.º



Harmônico 3.º 5.º



Harmônico 4.º 7.º



A figura mostra os vários modos de vibrar dos tubos abertos e fechados. Note que as frequências dessas séries harmônicas são:

tubo aberto: $f_1, 2f_1, 3f_1, \dots$

tubo fechado: $f_1, 3f_1, 5f_1, \dots$