Problema n°9

Columna de aire de $L = 2\,m$ abierto en los dos extremos.

Frecuencia $f_n = 410\ Hz$.

$f_{n+1} = 492\ Hz$

Calcular la velocidad del sonido v

$$f_n = \frac{n v}{2L} \rightarrow \frac{v}{2L} = \frac{f_n}{n}$$

$$f_{n+1} = \frac{(n+1) v}{2L} \rightarrow \frac{v}{2L} = \frac{f_{n+1}}{n+1}$$

$$\frac{f_n}{n} = \frac{f_{n+1}}{n+1}$$

$$\frac{f_{n+1}}{f_n} = \frac{n+1}{n}$$

$$\frac{492}{410} = \frac{n+1}{n}$$

$$\frac{n+1}{n} = 1,2$$

$$n+1 = 1,2n$$

$$n(1,2-1) = 1$$

$$n = \frac{1}{0,2} = 5$$

$$f_5 = \frac{5v}{2L} \rightarrow v = \frac{2L f_5}{5} = \frac{2 \times 2 \times 410}{5} = 328\ m/s$$

$$v = 328\ m/s$$