Sound waves

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Solution: *a. We have,*

$$v_s = \lambda_n f_n = \frac{2L}{n} f_n = \frac{2L}{n+1} f_{n+1} \ ,$$

with $f_n = 440$ *Hz e* $f_{n+1} = 610$ *Hz. Portanto,*

$$\Delta f = f_{n+1} - f_n = \frac{n+1}{2L} v_s - \frac{n}{2L} v_s = \frac{v_s}{2L} \ .$$

Finally, $L = \frac{v_s}{2\Delta f} = 1$ *m.*
b. We also know,

$$n = \frac{f_n}{f_{n+1} - f_n} = 2 \ .$$

Hence, $v_s = \lambda_n f_n = \frac{2L}{n} f_n = 440$ *m/s.*