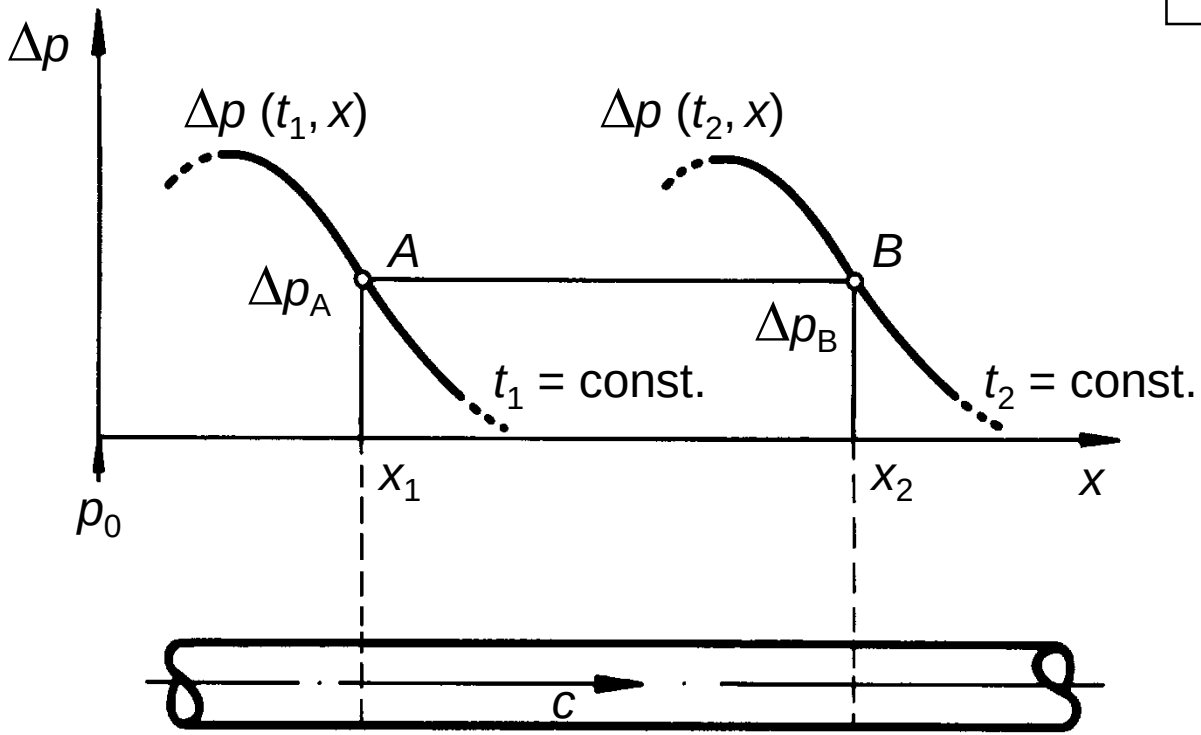
Assumption: $f\left(t + \frac{x}{a}\right) = 0$

Forward travelling wave

$$\Delta p(t, x) = \rho_0 \cdot F\left(t - \frac{x}{a}\right)$$

$$p = p_0 + \rho_0 \cdot F\left(t - \frac{x}{a}\right) - \rho_0 \cdot f\left(t + \frac{x}{a}\right)$$

$$c = c_0 \underbrace{+\frac{1}{a} \cdot F\left(t - \frac{x}{a}\right)}_{\text{forward}} \underbrace{+\frac{1}{a} \cdot f\left(t + \frac{x}{a}\right)}_{\text{reverse}}$$



$$\Delta p_A = \Delta p_B$$

$$\rho_0 \cdot F\left(t_1 - \frac{x_1}{a}\right) = \rho_0 \cdot F\left(t_2 - \frac{x_2}{a}\right)$$

$$t_1 - \frac{x_1}{a} = t_2 - \frac{x_2}{a}$$

$$x_2 - x_1 = a \cdot (t_2 - t_1) = \Delta x_F$$

Backward travelling wave

$$\Delta x_f = a \cdot (t_1 - t_2) = -\Delta x_F$$