

Бекешева Анастасія ФІ-12

$$u = x \pm vt$$

$$\begin{aligned}\frac{\delta u}{\delta x} &= 1; & \frac{\delta u}{\delta t} &= \pm v \\ \frac{\delta f}{\delta x} &= \frac{\delta f}{\delta u} \frac{\delta u}{\delta x}; & \frac{\delta f}{\delta t} &= \frac{\delta f}{\delta u} \frac{\delta u}{\delta t}; & \frac{\delta f}{\delta x} &= \frac{\delta f}{\delta u} \Rightarrow \frac{\delta^2 f}{\delta x^2} = \frac{\delta^2 f}{\delta u^2} \\ \frac{\delta f}{\delta t} &= \pm v \frac{\delta f}{\delta u} \Rightarrow \frac{\delta^2 f}{\delta t^2} = v^2 \frac{\delta^2 f}{\delta u^2}\end{aligned}$$

Застосуємо рівняння Д'Аламбера:

$$\frac{\delta^2 f}{\delta x^2} - \frac{1}{v^2} \cdot \frac{\delta^2 f}{\delta t^2} = \frac{\delta^2 f}{\delta u^2} - \frac{1}{v^2} \cdot \left(v^2 \frac{\delta^2 f}{\delta u^2} \right) = 0$$