Note manuscrite

Carnet de n...	Premier carnet de notes		
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Pour un élément de corde de masse $dm = \mu dx$

$$\mu dx \frac{\partial^2 \vec{\psi}}{\partial t^2} = \vec{T}(x,t) + \vec{T}(x+dx,t)$$

Projection selon x :

$$0 = -T(x,t)\cos\alpha(x,t) + T(x+dx,t)\cos\alpha(x+dx,t)$$

$\cos\alpha \simeq 1$

$$0 = -T(x,t) + T(x+dx,t)$$

$$T(x,t) = T(x+dx,t) = T_0$$

Projection selon y :

$$\mu dx \frac{\partial^2 \psi}{\partial t^2} = -T(x,t)\sin\alpha(x,t) + T(x+dx,t)\sin\alpha(x+dx,t)$$

$\sin\alpha \approx \alpha$

$$\mu dx \frac{\partial^2 \psi}{\partial t^2} = T_0(-\alpha(x,t) + \alpha(x+dx,t))$$

$$\mu \cancel{dx} \frac{\partial^2 \psi}{\partial t^2} = T_0 \frac{\partial \alpha(x,t)}{\partial x} \cancel{dx}$$

$$\frac{\partial^2 \psi}{\partial t^2} = \frac{T_0}{\mu} \frac{\partial \alpha(x,t)}{\partial x}$$

$$\alpha(x,t) = \tan(\alpha,t) = \frac{\partial \psi(x,t)}{\partial x}$$

$$\Rightarrow \boxed{\frac{\partial^2 \psi}{\partial t^2} = \frac{T_0}{\mu} \frac{\partial^2 \psi(x,t)}{\partial x^2}}$$

Equation d'Alembert.