Wellengleichung für Schall für Absolutwerte

KG: $\frac{\partial \rho}{\partial t} + \frac{\partial}{\partial x}(\rho v) = 0$ $\quad \Big| \frac{\partial}{\partial t}$

IG: $\frac{\partial}{\partial t}(\rho v) + \frac{\partial}{\partial x}(\rho v^2 + p) = 0 \quad \Big| \frac{\partial}{\partial x}$ (1)

$$\left.\begin{aligned} \frac{\partial^2 \rho}{\partial t^2} + \frac{\partial^2}{\partial x \partial t}(\rho v) &= 0 \\ \frac{\partial^2}{\partial t \partial x}(\rho v) + \frac{\partial^2}{\partial x^2}(\rho v^2 + p) &= 0 \end{aligned}\right\} \ominus$$

$$\frac{\partial^2 \rho}{\partial t^2} - \frac{\partial^2}{\partial x^2}(\rho v^2 + p) = 0$$

$$\frac{p_0}{\rho_0^\kappa} = \frac{p}{\rho^\kappa} \Rightarrow p = \frac{p_0}{\rho_0^\kappa}\rho^\kappa$$

$$\frac{\partial^2 \rho}{\partial t^2} - \frac{p_0}{\rho_0^\kappa} \cdot \frac{\partial^2 \rho^\kappa}{\partial x^2} - \underbrace{\frac{\partial^2}{\partial x^2}(\rho v^2)}_{\Downarrow \text{ (Linearisierung)}} = 0 \quad (2)$$

simultane Lösung von (1) & (2)
für $\rho(x,t)$ und $v(x,t)$