

Seminar of the Work Group
Nonlinear Partial Differential Equations
WS 21/22

Speaker: Sebastian Ohrem
November 16th, 2021, 14:00 - 15:30
Seminar room: 3.068

Well-posedness for a (1+1)-dimensional quasilinear wave equation

KIT

Abstract

In this talk, we investigate the quasilinear wave equation

$$V(x)u_{tt} - u_{xx} + \delta_0(x) \frac{df(u_t)}{dt} = 0, \quad (x, t) \in \mathbb{R} \times \mathbb{R}. \quad (\text{P})$$

Especially, the nonlinearity $f(y) = \gamma \cdot y^3$ with $\gamma > 0$ and the potential V being a periodic step potential is of interest in applications.

We begin by establishing a setting which is suitable to study the problem (P) as an initial value problem, since a classical C^2 -setting is not compatible with the nonlinearity. We then discuss how to show well-posedness by employing the Banach Fixed-Point theorem locally and considering related boundary value problems.

Lastly, we look at breather solutions of (P) as well as long-time behaviour, where recent results as well as ongoing problems will be discussed.