Time-Periodic Waves for a Quasilinear Wave Equations Based on a Kerr-Nonlinear Maxwell Model

We consider quasilinear wave equations

$$g(x)\mathbf{E}_{tt} + \nabla \times \nabla \times \mathbf{E} + h(x)(|\mathbf{E}|^2\mathbf{E})_{tt} = 0 \quad \text{on} \quad \mathbb{R} \times \mathbb{R}^3$$

which arise in the study of localized electromagnetic waves modeled by Kerr-nonlinear Maxwell's equations. Here $\mathbf{E} : \mathbb{R} \times \mathbb{R}^3 \to \mathbb{R}^3$ is the electric field. We are interested in breathers, which are time-periodic, spatially localized solutions. For several scenarios (described by the assumptions on the coefficients g, h) we prove existence of breathers using variational methods or bifurcation theory.

This is joint work with G. Brüll (Lund), P. Idzik (KIT), S. Kohler (KIT), S. Ohrem (KIT), and R. Schnaubelt (KIT).

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