



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

Speaker: Dr. Zoïa Moitier
December 21st, 2021, 14:00 - 15:30
Zoom Link: <https://kit-lecture.zoom.us/j/5732649920>
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Nonlinear Helmholtz equations with sign-changing diffusion coefficient

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Abstract

In this talk, we study nonlinear Helmholtz equations with sign-changing diffusion coefficients on bounded domains of the form $-\operatorname{div}(\sigma(x)\nabla u) - \lambda c(x)u = g(x, u)$. Using weak T-coercivity theory, we can establish the existence of an orthonormal basis of eigenfunctions of the linear part $-c(x)^{-1}\operatorname{div}(\sigma(x)\nabla u)$. Then, all eigenvalues are proved to be bifurcation points and we investigate the bifurcating branches both theoretically and numerically. As a fundamental example, we look at some one-dimensional model, we obtain the existence of infinitely many bifurcating branches that are mutually disjoint, unbounded, and consist of solutions with a fixed nodal pattern.