ALPEN-ADRIA UNIVERSITÄT KLAGENFURT

INVITATION TO THE DOCTORAL SEMINAR

Multi-parameter identification in nonlinear acoustics

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Chaired by Barbara Kaltenbacher | Department of Mathematics

Wednesday, 18 November 2026 | 10:00–11:00

HS 11

ABSTRACT

We study the forward and inverse problems for a periodic nonlinear Westervelt equation modelling nonlinear acoustic wave propagation, with a particular focus on recovering three spatially varying coefficients from partial boundary measurements. These coefficients describe the speed of sound, diffusivity, and acoustic nonlinearity. The identification is based on Dirichlet measurements on a subset of the boundary. We first analyze the forward problem and investigate the saturation effect arising from the nonlinear model. For the inverse problem, we consider the associated forward operator. We establish linearized uniqueness at a suitable expansion point in an all-at-once formulation, where the reference states are not required to satisfy the governing equation. Furthermore, we propose a frozen Newton-type reconstruction method in a Hilbert space setting. Numerical results illustrate the reconstruction method and demonstrate the saturation effect.

We hope to see you there!

