

On Recovering imaging coefficients in a nonlinear Wave Equation

Speaker: Bill Rundell, Texas A&M University

Abstract: This talk considers the inverse problem of recovering unknown coefficients in a nonlinear wave equation: the Westervelt equation $(1 - \kappa u)_{tt} - c^2 \Delta u + Du = 0$ that is a standard model for nonlinear acoustics. The imaging quantities of interest are the spatially-dependent functions $\kappa(x)$ and the wave speed $c(x)$. The damping operator Du can be quite complex involving a mixture of both spatially and temporal-dependent operators of possibly fractional order and should be considered as also potentially unknown. We develop several approaches on uniqueness and reconstruction algorithms as well as giving an indication of the underlying analysis of both the forward and the inverse problem(s).