Imaging with nonlinear and fractionally damped waves

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Abstract

The importance of ultrasound is well established in the imaging of human tissue. In order to enhance image quality by exploiting nonlinear effects, recently techniques such as harmonic imaging and nonlinearity parameter tomography have been put forward. These lead to a coefficient identification problem for a quasilinear wave equation. Another characteristic property of ultrasound propagating in human tissue is frequency power law attenuation leading to fractional derivative damping models in time domain. In this talk we will first of all dwell on modeling of nonlinearity on one hand and fractional damping on the other hand. Then we will discuss the linear inverse problem of photoacoustic tomography with fractional damping. Finally some first results on nonlinearity parameter imaging are shown.