Mathematics, Statistics, and Computer Science **@ UIC**

Mathematics and its Applications Seminar

Simulating nonlinear imaging

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Abstract: The majority of imaging technologies are sensitive to the linear properties of the imaged medium, for example Computed Tomography is sensitive to X-ray absorption and seismic imaging is sensitive to changes in wave velocity. When differentiating between healthy and cancerous tissue in medical imaging or oil and water in Earth imaging, there is growing evidence that contrasts in nonlinear material properties can also provide important information. A particular example is Ultrasound Vibro-Acoustography, in which the nonlinear interaction of ultrasound waves at multiple frequencies is used to generate images sensitive to both linear and nonlinear material parameters. Creating and testing a mathematical model of this experiment presents many computational challenges, arising from the range of scales and the intrinsic nonlinearity of the problem. To address these challenges, we have developed a set of integral equation methods specifically tailored to this problem, allowing the rapid, accurate, simulation of the experiment.

Wednesday, November 18 at 4:00 PM in SEO 636