Computational Mathematics Seminar

Regularization in Tomography - Dealing with Ambiguity and Noisy Data

Per Christian Hansen
Technical University of Denmark

Abstract: Tomographic reconstructions are routinely computed each day. Our reconstruction algorithms are so reliable that we sometimes forget we are actually dealing with inverse problems with inherent stability problems. This is because the algorithms automatically incorporate regularization techniques that, in most cases, handle very well the stability issues.

In this talk we take a basic look at the inverse problem of CT reconstruction, in order to understand the stability problems that manifest themselves in solutions that may be very sensitive to data errors and may also fail to be unique. We demonstrate how regularization is used to avoid these problems and make the reconstruction process stable, and how the regularization is incorporated in standard reconstruction algorithms. Moreover, we shall see that different regularization techniques have different impact in the computed reconstructions.

Thursday, March 13, 2014, 2:00 pm
Mathematics and Science Center: W306

Mathematics and Computer Science
Emory University