## Liu Bie Ju Centre for Mathematical Sciences City University of Hong Kong

## Mathematical Analysis and its Applications Colloquium

Organized by Prof. Ya Yan LU and Prof. Wei Wei SUN

## Reconstruction algorithms in sonic tomography

by

Professor Frank Natterer University of Münster, Germany

Date : April 03, 2012 (Tuesday) Time : 4:30 pm to 5:30 pm Venue : Room B6605 (College Conference Room) Blue Zone, Level 6, Academic 1 (AC1) City University of Hong Kong

## ABSTRACT:

Sonic tomogaphy plays an important role in medical radiology, nondestructive testing and seismic exploration. Most of the work in this field is done by linearization. In this talk we deal with iterative methods for the fully nonlinear problem. We start with a survey on the results obtained by linearization. For the fully nonlinear problem we describe in detail the Kaczmarz method in the time domain. It turns out that Kaczmarz's method, whose linear version is widely used in X-ray tomography, can be viewed in a very intuitive way as consecutive time reversal. We show by numerical examples that Kaczmarz easily solves the standard problems, such as transmission tomography and reflection imaging with broadband data. We also study the behavior of the method in non-standard situations, such as caustics, trapped rays, and, in particular, missing low frequencies in the source pulse.

Light refreshments will be provided at Room B6605 before the colloquium from 4:00 pm to 4:30 pm. Please come and join us!

\*\* All interested are welcome \*\* For enquiry: 3442-9816





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