



IPL
escola superior
de tecnologia e gestão
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Seminário do Departamento de Matemática

New concepts in directional image processing, sparse reconstructions and applications in inverse problems

Prof. Dr. Gerd Teschke¹

18 de Fevereiro de 2009

9h45 - Sala A.S1.12

Abstract: In this seminar we shall be concerned with the shearlet transform in arbitrary space dimensions and its capabilities in singularity analysis and sparse signal coding. Based on particular sparsity measures we present applications in the field of image recolorization and medical imaging.

Modern technology allows for easy creation, transmission and storage of huge amounts of data. Confronted with a flood of data, such as internet traffic, or audio and video applications, nowadays the key problem is to extract the relevant information from these sets. Usually the first step is to decompose the signal with respect to suitable building blocks which are well-suited for the specific application and allow a fast and efficient extraction. In this context, one particular problem which is currently in the center of interest is the analysis of directional information. Due to the bias to the coordinate axes, classical approaches such as wavelet or Gabor transforms are clearly not the best choices, and hence new building blocks have to be developed. In recent studies, several approaches have been suggested such as ridgelets, curvelets, contourlets, shearlets, and many others. Recently, shearlets showed clear advantages among these systems. In this seminar these new systems will be presented. It will be a great opportunity for all the researchers interested to meet this wonderful field and its practical applications.

Short Resume of Prof. Dr. Gerd Teschke

Prof. Gerd Teschke is leader of the group "Inverse problems in Science and Technology" at the Konrad-Zuse-Institut, a private research institute in Berlin, collaborating with the most important research centers of time-frequency and wavelet analysis. His research interests include time-frequency analysis, wavelet theory, frame theory in image and signal processing, operator equations and inverse problems, localization operators, and uncertainty relations. He is particularly interested in applications to medical data analysis, meteorological radars, Color Image inpainting, Image restoration, and time series forecasts (<http://www.zib.de/Numerik/InverseProblems/projects/index.en.html>). He has been a visiting research fellow at Princeton University in 2002/2003. More details can be found at his webpage: <http://www.zib.de/teschke/>

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