



Kolloquium über Mathematische Statistik und Stochastische Prozesse

Freitag, den 13.04.2012, 16.15 Uhr, Hörsaal 5

DR. RUI CASTRO (Technische Universität Eindhoven) ¹

"Adaptive Sensing for Sparse Signal Detection and Localization"

Zusammenfassung/Abstract

In this talk I will consider the problem of detection and localization of sparse signals in noise when adaptive sensing approaches are allowed. Adaptive sensing means the data collection process is sequential and the collection of future data is guided by all data collected so far. This is in contrast with most traditional approaches where all the data is collected passively before any analysis is done. The added flexibility of sequential designs results in dramatic gains in performance, both for signal estimation and detection. I consider in particular the setting where the signal of interest is a n -dimensional vector with solely s non-zero components, and show that if sequential designs are allowed the minimum signal component magnitude necessary to guarantee accurate detection or localization needs only to scale with s . This is remarkable since there is no (asymptotic) dependence on the extrinsic dimension n . On the other hand if sequential designs are not allowed the magnitude of the signal components must necessarily scale with the extrinsic dimension n . Our characterization involves both lower performance bounds, as well as simple but powerful adaptive sensing procedures able to nearly achieve these fundamental limits for a while range of scenarios. Recent extensions of these ideas to compressed sensing scenarios will also be discussed.

¹DR. RUI CASTRO

Technische Universität Eindhoven

Department of Mathematics

Eindhoven University of Technology

P.O. Box 513

5600 MB Eindhoven

The Netherlands

rmcastro@tue.nl

<http://www.win.tue.nl/~rmcastro/>

Kontakt: Juniorprof. Dr. Angelika Rohde, Tel. 040 42838 4931, Raum T23,
Email: rohde@math.uni-hamburg.de