

## Statistisches Kolloquium

- Zeit: Mittwoch, 15.01.2014, 16.00 - 17.00
- Ort: Seminarraum SE 101 (Templergraben 90)
- Vortragender: **Prof. Pierre Mathonet**  
Department of Mathematics  
University of Liège
- Titel: On the Signatures of Coherent Systems

### Abstract

We consider coherent systems made of  $n$  interconnected components. Assuming that these components have i.i.d. lifetimes, F. Samaniego introduced the concept of (structural) signature as the  $n$ -tuple whose  $k$ th coordinate is the probability that the  $k$ th failure causes the system to fail. It turns out that in the i.i.d. framework the signature  $s$  depends only on the structure of the system and not on the distribution of the lifetimes of the components. Using his concept of structural signature, Samaniego obtained an expression of the system reliability in terms of reliabilities of  $k$ -out-of- $n$  systems.

This definition of the signature extends in the non-i.i.d. situation where it gives rise to a signature vector  $p$  (the probability signature), that depends in general both on the structure of the system and on the joint distribution of the lifetimes of the components.

After a general introduction to the concept of structural signature, we will explain Samaniego's decomposition of reliability. Then we will focus on the extension of the signature in the most general situation. We will show how it can be computed using the relative quality function associated with the distribution of the component lifetimes and discuss the possible extensions of Samaniego's decomposition of reliability for a general distribution of lifetimes.

In a second part of the talk, we will explain how the structural and probability signatures can be decomposed when the coherent system under consideration admits a modular decomposition, using the signatures of the modules.

Für weitere Informationen wenden Sie sich bitte an:

Marco Burkschat (Tel.: 94802, [marco.burkschat@rwth-aachen.de](mailto:marco.burkschat@rwth-aachen.de))