



Universität Hamburg  
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FAKULTÄT  
FÜR MATHEMATIK, INFORMATIK  
UND NATURWISSENSCHAFTEN

Fachbereich Mathematik

# Kolloquium über Mathematische Statistik und Stochastische Prozesse

**Charles Tillier, Ph.D.**

Télécom ParisTech

**12.03.2019, 16:15 Uhr, Hörsaal 5**

## **Robust estimation for Markov chains with application to PDMPs**

Abstract:

During this presentation, I will show that the embedded chain associated to a Piecewise Deterministic Markov Process (PDMP) may be used to build several robust estimators, which is of particular interest when the underlying process is contaminated by outliers. I will further develop the "Approximate Regenerative Block Bootstrap method" in the framework of PDMP: by eliminating blocks having either too much contribution to the statistics of interest or having a too large length, I will propose efficient robust estimators for the embedded chain of the PDMP. To highlight the applicability of the method, I will suggest robust estimators of risk indicators such as the ruin probability (high threshold exceedances), the expected shortfall and the extremal index (measure of degree of clustering of extremes) of two PDMP: the Cramér-Lundberg model with a dividend barrier in insurance and the Kinetic Dietary Exposure Model used in modeling pharmacokinetics of contaminants. This work was conducted in close collaboration with Patrice Bertail, professor at the University Paris Nanterre and Gabriela Ciolek, Phd student at Télécom ParisTech. Keywords. PDMP; Robust estimation; Regenerative methods; Markov chains; Ruin theory; Insurance, Dietary risk assessment.

**Charles Tillier, Ph.D.**

Télécom ParisTech

<http://www.tsi.telecom-paristech.fr/ssa/en/postdoctoral-researchers/>

*Kontakt:*

*Dr. Leonie Selk (<http://www.math.uni-hamburg.de/home/selk/>)*

*Universität Hamburg*