



BERUFUNGSVORTRÄGE „Stochastik“

Die Berufungsvorträge schließen folgende Punkte mit ein:

Didaktischer Vortrag (20 Minuten)
Fragen/Pause (10 Minuten)
Wissenschaftlicher Vortrag (45 Minuten)
Fragen/Pause (15 Minuten)
Kommissionelles Hearing -
(Dekanatsbesprechungszimmer, 11. Stock)

Mittwoch, 20. September 2017, Sky Lounge

Prof. Noam Berger
(TU München)

10:00 Uhr: Didaktischer Vortrag

“Maximum inequalities via reflection”

We consider the simple random walk in one dimension, and ask what we can be said about the distribution of its maximum between times zero and N . We use a simple reflection idea to get very good bound on this distribution. We might also mention some other application to this method.

10:30 Uhr: Wissenschaftlicher Vortrag

“Harnack inequality for balanced environments”

We consider random balanced, not necessarily elliptic, difference equations, and prove a Harnack inequality in the i.i.d. case. We discuss the relation of this result with random walk and percolation. We then discuss non-i.i.d. cases, and, time permitting, discuss the conjectured continuous analogue of this result.

Mittwoch, 20. September 2017, Sky Lounge

Prof. Nathanaël Berestycki
(University of Cambridge)

16:00 Uhr: Didaktischer Vortrag

“The mean value theorem”

16:30 Uhr: Wissenschaftlicher Vortrag

“Universality and conformal invariance for the dimer model”

The dimer model on a finite bipartite graph is a uniformly chosen perfect matching, i.e., a set of edges which cover every vertex exactly once. It is a classical model of mathematical physics, going back to work of Kasteleyn and Temperley/Fisher in the 1960s, with connections to many topics including determinantal processes, random matrix theory, algebraic combinatorics, discrete complex analysis, etc.

A central object for the dimer model is a notion of height function introduced by Thurston, which turns the dimer model into a random discrete surface. I will discuss a series of recent results with Benoit Laslier and Gourab Ray where we establish the convergence of the height function to a scaling limit in a variety of situations. This includes simply connected domains of the plane with arbitrary linear boundary conditions for the height, in which case the limit is the Gaussian free field, and Temperleyan graphs drawn on Riemann surfaces. In all these cases the scaling limit is universal (i.e., independent of the details of the graph) and conformally invariant. A key new idea in our approach is to exploit "imaginary geometry" couplings between the Gaussian free field and Schramm's celebrated SLE curves. All the relevant objects will be introduced during the talk, and no background will be assumed.



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Donnerstag, 21. September 2017, Sky Lounge

Prof. Andreas Kyprianou
(University of Bath)

10:00 Uhr: Didaktischer Vortrag

“Markov Chains, Kingman’s Coalescent and coming down from infinity”

We take the simple setting of a continuous-time Markov chains and look at how Kingman made the remarkable step of using them to model phylogenic trees in a model that is today called Kingman’s Coalescent. We look at the stochastic behaviour of the Kingman's Coalescent and a phenomenon of how looking backwards in time from an infinite number of genetic types sees rapid descent form a single ‘Eve’ genotype.

10:30 Uhr: Wissenschaftlicher Vortrag

“Terrorists never congregate in even numbers”

We analyse a class of fragmentation-coalescence processes defined on finite systems of particles organised into clusters. Coalescent events merge multiple clusters simultaneously to form a single larger cluster, while fragmentation breaks up a cluster into a collection of singletons. Under mild conditions on the coalescence rates, we show that the distribution of cluster sizes becomes non-random in the large-scale limit. Moreover, we discover that, in the limit of small fragmentation rate, these processes exhibit a universal heavy tailed distribution with exponent $3/2$. In addition, we observe a strange phenomenon that if coalescence of clusters always involves 3 or more blocks, then the large-scale limit has no even sided blocks. Some complementary results are also presented for exchangeable fragmentation-coalescence processes on partitions of natural numbers. In this case one may work directly with the infinite system and we ask whether the process can come down from infinity. The answer reveals a remarkable dichotomy.

This is based on two different pieces of work with Tim Rogers, Steven Pagett and Jason Schweinsberg.



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Freitag, 22. September 2017, Sky Lounge

Prof. Erika Hausenblas
(Montanuniversität Leoben)

10:00 Uhr: Didaktischer Vortrag
“Das Ito Integral”

10:30 Uhr: Wissenschaftlicher Vortrag
“The stochastic Gray Scott System”

Reaction and diffusion of chemical species can produce a variety of patterns, reminiscent of those often seen in nature. The Gray Scott system is a coupled equation of reaction diffusion type, modelling these kind of patterns. Depending on the parameter, stripes, waves, cloud streets, or sand ripples may appear.

These systems are the macroscopic model of microscopic dynamics. Here, in the derivation of the equation the random fluctuation of the molecules are neglected. Adding a stochastic noise, the inherent randomness of the microscopic behaviour is modelled. In particular, we add a time homogenous spatial Gaussian random field with given spectral measure.

In the talk, first the Gray Scott system is motivated. Then, the stochastic system is introduced and the question of existence and uniqueness are addressed. In the second part of the talk, we present some numerical simulations and the corresponding adapted approximation scheme is explained.

Freitag, 22. September 2017, Besprechungszimmer 2. Stock

Prof. Martina Hofmanová
(TU Berlin)

16:00 Uhr: Didaktischer Vortrag
“Bedingte Wahrscheinlichkeit - Formel von Bayes”

16:30 Uhr: Wissenschaftlicher Vortrag
“Randomness in modeling of fluid motion”

Partial differential equations are commonly used to describe a wide variety of phenomena in physics, chemistry, engineering or economics. Very often, an intrinsic presence of randomness has to be additionally taken into account. In this talk, I will consider PDE models used for modeling of fluid motion and discuss the motivation for a suitable stochastic perturbation. I will explain how various assumptions on coefficients and roughness of the noise naturally ask for different notions of solution with different regularity properties and different techniques of the proofs. On the one hand, the problems under consideration include stochastically forced compressible fluid flows treated by means of the stochastic Itô integration theory. On the other hand, I will discuss a recent pathwise approach towards PDEs driven by rough paths based on ideas from Lyons' rough path theory.