POSTER SESSIONS OF XXIII EBP AND ABSTRACTS

SESSION 1 (Monday late afternoon)

(1) Lucas Affonso (IME-USP)
(2) Caroline Lourenço Alves (ICMC-USP)
(3) Vitor Gustavo de Amorim (USP-UFSCar-IFSP)
(4) Weberson da Silva Arcanjo (UFMG)
(5) Cristian Favio Coletti (UFABC)
(6) Átila Prates Correia (UFSCar-USP)
(7) Susana Frómeta Fernandez (UFRGS)
(8) Ricardo Felipe Ferreira (IME-USP)
(9) Roberto Vila Gabriel (UnB)
(10) Jamer Insupe Roldan Gonzales (UnB)
(11) Rafael Jorge Hauy (IF-USP)
(12) Giulio Iacobelli (UFRJ)
(13) Lucas Roberto de Lima (UFABC)
(14) João Vitor Maia (IME-USP)
(15) Camila Bertini Martins (UNIFESP)
(16) José Ricardo G. Mendonça (IME-USP)
(17) Walner Mendonça (IMPA)
(18) José Carlos Simon de Miranda (IME-USP)

SESSION 2 (Thursday late afternoon)

(1) Vitor Marquioni Monteiro (IFGW-UNICAMP)
(2) Alexandre Rodrigues de Oliveira (IFB)
(3) Christian Olivera (UNICAMP)
(4) Paulo Tadeu Meira e Silva de Oliveira (EESC/STT-USP)
(5) Ioannis Papageorgiou (IME-USP)
(6) Eliézer Soares Pereira (IFB)
(7) Graccyela Rosybell Salcedo Pirela (UFRJ)
(8) Fernando Pigeard de Almeida Prado (FEA/RP-USP)
(9) Thiago Raszeja (IME-USP)
(10) Zoraida Fernandez Rico (IMPA)
(11) Marcos Vincius Araújo Sá (UFMG)
(12) Humberto Carelos Sanna (UFMG)
(13) Thaís Miranda dos Santos (IFB)
(14) Francys Andrews de Souza (UNICAMP)
(15) Cristel Ecaterin Vera Tapia (UFSCar-USP)
(16) Márcio Luis Lanfredi Viola (UFSCar)
(17) Shangjie Yang (IMPA)
(18) Leonel Zuaznabar (IME-USP)

Quantum Ising model with decaying fields

Lucas Affonso

IME-USP, Brazil

Abstract:

The Quantum Ising model was introduced in the 1960s for the study of ferromagnets where the quantum effects are relevant, but only recently new phenomena are being discovered. We study the phase diagram of this model using a technique introduced in the 1970s by Araki and Ion, where a relation between the DLR formalism and the KMS condition was established. As consequence, we prove that, when the transverse field is summable and the classical field is decaying as $|i|^{\gamma}$, the model undergoes a phase transition for $\gamma > 1$ and has uniqueness when $\gamma < 1$.

Diagnosis and modularity analysis of patients networks with mental disorders

Caroline Lourenço Alves[1], Francisco Aparecido Rodrigues[2]

[1,2]Universidade de São Paulo

Abstract:
Data mining and knowledge discovery have been applied in different fields such as bioinformatics, customer transaction activity, security related computer audits, text analysis, among others. In medicine, data mining methods have proven to be very effective in performing automatic diagnostics to improve medical decisions. Medical data have also been represented as complex networks in order to include connections between different elements. For example, in the case of the brain, cortical regions can represent vertices in a graph and the connections can be dened through cortical activities. Following this representation, we can compare the brain structure of healthy patients with those of subjects presenting mental disorder in order to quantify how the structure of the brain is related to behavioral and neurological changes. Another important analysis is the modularity of the network which can quantify abnormality of brain network community structure. Here, we are interested in using data mining methods and complex networks to classify patients according to four different types of mental desorders, i.e., schizophrenia, autism, attention decit / hyperactivity disorder, and progressive supranuclear paralysis; in addition, we analyzed the modularity of these patients' networks. Our results show that it is possible to develop accurate methods to perform automatic diagnosis of mental disorders.

Return times in mixing processes

Vitor Gustavo de Amorim

Universidade Federal de São Carlos - Universidade de São Paulo - Instituto Federal de São Paulo

Abstract:
We consider the return time of a cylinder in stochastic processes. For stationary processes, the Poincaré recurrence theorem guarantees that a cylinder with positive measure has finite return time almost surely. If the process is also ergodic, Kac's Lemma states that the expected return time of a cylinder is the inverse of its measure. For sufficiently mixing processes, the return times have approximately exponential distribution, in some cases with approximation error. We present the general aspects of the return times and a results in specific case of the ψ-mixing processes, providing the error of the exponential approximation.

Random Walks on Dynamical Random Environments with Non-Uniform Mixing

Weberson da Silva Arcanjo

Universidade Federal de Minas Gerais

Abstract:
This poster is based on paper Random Walks on Dynamical Random Environments with Non-Uniform Mixing by Oriane Blondel, Marcelo Hilário and Augusto Teixeira. In this work, the authors studied random walks on dynamical random environments in 1 + 1 dimensions. Under a mild mixing assumption on the environment, they established a law of large numbers for the random walk as well as a concentration inequality around its asymptotic speed. The mixing hypothesis imposes a polynomial decay rate of covariances on the environment with sufficiently high exponent but does not impose uniform mixing. Examples of environments in which their methods apply include the contact process and Markovian environments with a positive spectral gap, such as the East model.

Construction of Markovian processes with given symmetries

Cristian Favio Coletti

CMCC-UFABC

Abstract:
In this work we study the algebraic properties of the Lie group of the invertible stochastic matrices and the properties of its tangent space. Further, when we study the co-product of a prominent element from the center of the tangent space, we obtain the infinetesimal generator of a continuous-time Markov chain with symmetries given by this tangent space. And, in possession of this generator, we define an interacting particle system in a ring of N sites. Finally, we show that this process is autodual.

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Kolmogorov extended axioms and negative probabilities

Átila Prates Correia

ICMC - USP and DEs - UFSCar

Abstract:
As an attempt to extend the concept of probability to negative numbers, the content to be exposed in this poster makes use of measure theory in order to achieve this goal. More precisely, given a measurable space (Ω, Σ), we associate to it a finite signed measure P under convenient restrictions (axioms) which turn feasible the concept of negative probability. Although we do not provide an interpretation for the negative probabilities, we propose the structure such concept should fit in.

Asymptotic behavior of a Non-Cascading 2-GREM Dynamics at extreme time scales

Susana Frómeta Fernández

UFRGS - Universidade Federal do Rio Grande do Sul

Abstract:
Let us define the 2-GREM model. Given $p \in (0,1)$ and $N > 0$ integer, let us define $N_1 := \lfloor pN \rfloor$; $N_2 := N - N_1$; $\mathcal{V}_{\mathcal{N}_\infty} := \{-\infty, \infty\}^{\mathcal{N}_\infty}$; $\mathcal{V}_{\mathcal{N}_\in} := \{-\infty, \infty\}^{\mathcal{N}_\in}$ and $\mathcal{V}_{\mathcal{N}} := \mathcal{V}_{\mathcal{N}_\infty} \times \mathcal{V}_{\mathcal{N}_\in}$.

Let us consider $\{X_{\sigma_1}, X_{\sigma_1,\sigma_2} : \sigma_1 \in \mathcal{V}_{\mathcal{N}_\infty}, \sigma_\in \in \mathcal{V}_{\mathcal{N}_\in}\}$ a family of independent standard Gaussian random variables. For $a \in (0,1)$ consider the Gaussian random variable $X_\sigma := \sqrt{a}X_{\sigma_1} + \sqrt{1-a}X_{\sigma_1,\sigma_2}$.

For $\beta > 0$, we consider the Random Hopping dynamics which is defined as a Markov jump process $(\sigma^N(t), t > 0)$ that evolves along the edges of $\mathcal{V}_{\mathcal{N}}$ in the following way: the configuration $\sigma = (\sigma_1, \sigma_2) \in \mathcal{V}_{\mathcal{N}}$ changes one coordinate in σ_1 at rate $\frac{N_1}{N} e^{-\beta\sqrt{N}X_\sigma}$ and changes one coordinate of σ_2 at rate $\frac{N_2}{N} e^{-\beta\sqrt{N}\sqrt{1-a}X_{\sigma_1\sigma_2}}$.

The *cascading case* occurs when $p < a$. In [1], L. R. Fontes and V. Gayrard found a constant β_{FT}, called the fine tuning temperature, which gives us three different limits results, as N goes to infinity, for a rescaled $\sigma^N(t)$ depending if β is equal, greater or smaller than β_{FT}.

In this work we study the *non-cascading case*, that is, the case $p > a$. We found a respective β_{FT} for this case, which happens to be different from the previous one, and obtain the corresponding limiting results.
This is a joint work with Luiz Renato Fontes and Leonel Zuaznábar.

References

[1] Fontes, Luiz Renato and Gayrard, Véronique. Asymptotic behavior and aging of a low temperature cascading 2-GREM dynamics at extreme time scales. arXiv preprint arXiv:1801.08832, 2018.

High Dimensional Statistical Inference for a neuronal connections model using LASSO

Ricardo Felipe Ferreira

University of São Paulo

Abstract:
In this work, it is proposed a neuronal connections model based on an infinite network and it is considered the problem of estimating the probability of one neuron spikes given the past history of all other neurons in this network. The estimation method is based on logistic regression subject to an ℓ_1-coinstraint. The method is analyzed under a high-dimensional regime in which the number of observations is much less than the number of parameters.

Joint work with Florencia Leonardi (USP, Brazil).

On the scaling limit phase transition in a two-dimensional random polymer model

Roberto Vila Gabriel

Universidade de Brasília

Abstract:
In this work [LV18] we consider two-dimensional random polymers with presence of a class of power law decaying interaction, and we prove that the critical inverse temperature where the polymer model behavior changes is equal to β_c, the critical inverse temperature of a related one-dimensional Ising model. Roughly speaking, we prove the existence of a critical point $\beta_c \in (0, +\infty)$ such that the scaling limit of our random polymer model converges in the Wasserstein distance to the planar standard Brownian motion in the subcritical regime $\beta < \beta_c$. Moreover, we also prove that it does not scales to the Brownian motion when $\beta > \beta_c$.

References

[LV18] Luis R. Lucinger and R. Vila. *Existence of Scaling Limit Phase Transition in a Two-dimensional Random Polymer Model.* Preprint, 2018.

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On the absence of replica symmetry breaking for the random field Ising model in the presence of a class of non-Gaussian disorders

Jamer Insupe Roldan Gonzales

Universidade de Brasilia

Abstract:
In 2015 Chatterjee [1] proved that the replica symmetry is not broken in the Random Field Ising Model (RFIM), in any temperature and any dimension (this result considering Gaussian field). In models with random interactions or random fields (Spin Glasses, RFIM) is usual to study if the model breaks or does not break the replica symmetry. Naturally, arising the question of what happens with the RFIM if the random field is non-Gaussian. Thus in a work with Vila [2], we prove the absence of replica symmetry breaking of the RFIM for a class of non-Gaussian fields using a definition of Parisi [3]. This is possible because we use a generalized Gaussian integration by parts and using generalized overlaps we get to demonstrate the Guirlanda-Guerra inequalities and with all these, we get the desired result. Also, we show examples of random fields in this class.

References

[1] Chatterjee, S. (2015). Absence of replica symmetry breaking in the random field Ising model. Communications in Mathematical Physics, 337(1), 93-102.

[2] Roldan, J; Vila, R. (2019). On the absence of replica symmetry breaking for the random field Ising model in the presence of a class of non-Gaussian disorders. arXiv preprint arXiv:1811.07003v2

[3] Parisi, G. (2002). The physical meaning of replica symmetry breaking. arXiv preprint cond-mat/0205387.

Renormalization group study of rigidity for one charge hierarchical Coulomb system in $\mathbb{R}$

Rafael J. Hauy and Domingos H. U. Marchetti

IFUSP

Abstract:
We consider the variable $N(U)$ corresponding to the number of particles inside an open subset U of $\mathbb{R}$ or an onecharge particle system interacting through a hierarchical Coulomb potential, introduced recently by Chatterjee (arXiv:1708.01965v4) in order to prove upper and lower bounds for the order fluctuations $\nu_d(\log n, n1/4$ and $n^{1/3}$, resp.) of $N(U)$ ind $d = 1$(log-gas), 2 and 3 dimensions.

In the present work we explain how the renormalization group dynamics may provide for this model detailed information on the statistics of $N(U)$ for $U \subset [0,1]^d$. We aim at proving abnormal law about the rigid pattern: $Z(U) = (N(U) - n|U|)/\nu_d$ converges in distribution, as the number of particles n in $[0,1]^d$ tends to infinity, to a Gaussian with mean 0 and variance given by an explicit formula whose Physical content is described by Jancovici, Lebowitz and Manificat in their 1993 inspiring paper.

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Epidemic spreading by random walks on edge-transitive graphs

Giulio Iacobelli

UFRJ - IM

Abstract:
We study an SIS epidemic model with infections carried by mobile agents performing independent random walks on a graph. Agents can be either infected (I) or susceptible (S), and infection occurs when an infected agent meets a susceptible one. After a recovery time, an infected agent returns to state S and can be infected again. The End of Epidemic (EoE) denotes the first time when all agents are in state S, since after this moment no further infection can occur.

We present some preliminary results for the case of two agents on edge-transitive graphs. Specifically, we characterize EoE as a function of the network structure by relating the Laplace transform of EoE to the Laplace transform of the meeting time of two random walks. We also study the asymptotic behavior of EoE (asymptotically in the size of the graph) on complete graphs, complete bipartite graphs, and rings.

This is joint work with S. Shneer and D. Figueiredo.

Limit theorems for dependent Bernoulli processes and related random walks

Lucas Roberto de Lima

Universidade Federal do ABC

Abstract:
We study limit theorems for a class of Bernoulli random processes where the success probability of a trial, conditional on the previous trials, depends on the total number of successes already achieved. We show sufficient conditions under which it is possible to prove the strong law of large numbers, the central limit theorem and the law of iterated logarithm for partial sums of the Bernoulli random variables via martingale techniques. Moreover, we apply the results and techniques for some random walks with unbounded memory.

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Phase transition for the Potts model on the Cayley tree

João Vitor Teixeira Maia

Instituto de Matemática e Estatística da Universidade de São Paulo

Abstract:
The Potts model generalizes the Ising Model, in the sense that instead of consider spins taking only two values, it consider spins taking value on a finite set $\{1, \ldots, q\}$.

When considering the model on the Cayley Tree, we can prove the existence of phase transition by studding the so called splitting Gibbs measures. In this poster we will present the recent work of Bogachev and Rozikov (2019) who showed the behaviour of the model with a constant external field. Our objective is to extend theirs result to a decaying external field in a future work.

Bayesian meta-analytic measure

Camila B. Martins, Adriano Polpo, Carlos A. B. Pereira

UNIFESP, UFSCar, UFMT

Abstract:

Meta-analysis is a method that summarizes results from different studies of the same subject. The Bayesian meta-analytic measure is based on a combination of the posterior density functions obtained in each of the studies. The measure preserves both the heterogeneity between and within the studies, and it is assumed that the whole data from each study are available.

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Efficient uniform generation of random derangements with the expected distribution of cycle lengths

J. Ricardo G. Mendonça

Escola de Artes, Ciências e Humanidades, Universidade de São Paulo

Abstract:
We show how to generate random derangements with the expected distribution of cycle lengths by two different techniques: random restricted transpositions and sequential importance sampling. The algorithms possess a performance comparable to or better than those of currently known methods. Simulations suggest that the mixing time (in the total `XXX` variance distance) of the algorithm based on random restricted transpositions is $O(n^a \log n^2)$ with $a \simeq \frac{1}{2}$ and n the length of the derangement. For the sequential importance sampling algorithm we prove that it generates random derangements in $O(n)$ time with a probability $O(1/n)$ of failing. [`arXiv:1809.04571`].

Covering 3-coloured random graphs with monochromatic trees

Walner Mendonça

Instituto de Matemática Pura e Aplicada

Abstract:
We investigate the problem of determining how many monochromatic trees are necessary to cover the vertices of an edge-coloured random graph. More precisely, we show that for $p \gg \left(\frac{\ln n}{n}\right)^{1/6}$, in any 3-colouring of the random graph $G(n,p)$ we can find 3 monochromatic trees such that their union covers all vertices. This improves, for three colours, a result of Bucić, Korándi and Sudakov [arXiv:1902.05055].

This is a joint work with Yoshiharu Kohayakawa, Guilherme Mota and Bjarne Schülke.

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Maximum entropy distribution on the circle with given correlation

J.C.S. de Miranda

IME USP

Abstract:
Using techniques from the calculus of variations, we determine the maximum entropy distribution on the circle, $D = \{(x, y) \in R^2 : x^2 + y^2 \leq 1\}$, i.e., we determine the probability density function of the bivariate random vector (X, Y) whose image is contained in D, under the following moment and correlation restrictions: $EX = 0$, $EY = 0$ and $\mathrm{corr(X, Y)} = \rho$, for an arbitrary real constant $\rho \in (-1, 1)$. This distribution can be used in the simulation of complex valued time series in situations where we know that noise has zero mean and is bounded, and we have no additional information on it but the correlation coefficient of its real and imaginary parts.

New anomalous diffusion regimes in a bidimensional elephant random walk

Vitor Marquioni Monteiro

Institute of Physics "Gleb Wataghin", IFGW, UNICAMP

Abstract:
In this work, I introduce a multidimensional extension of the Elephant Random Walk (ERW) by coupling the memory among different directions. Although the discrete model is hard to solve, a Fokker-Planck equation can be obtained and continuous evolution equations for the first and second displacement moments can be found. A specific bidimensional coupling is proposed in order to elucidate the model and two new anomalous diffusion regimes appear. One regime is superdiffusive and the other is marginally superdiffusive, however, it is faster than that found in the original ERW.

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Heavy traffic modelling on the network and the overflow problem

Alexandre Rodrigues de Oliveira; Dr. Magno Alves de Oliveira; Dr. Wembesom Mendes Soares.

Instituto Federal de Braslia

Abstract:
In this work, a modeling will be presented for the process of occupying a buffer that is in the network architecture of the ON / OFF model of heavy traffic in high-speed networks. To this end, we have conducted guided studies of some classical probability tools, from random variables to scholastic processes, including stable laws, in order to provide the model with realistic characteristics of information traffic that occurs, for example, on the internet.

Well-posedness of the non-local conservation law by stochastic perturbation

Christian Olivera

UNICAMP

Abstract:

Stochastic non-local conservation law equation in the presence of discontinuous flux functions is considered in an $L^1 \cap L^2$ setting. The flux function is assumed bounded and integrable (spatial variable). Our result is to prove existence and uniqueness of weak solutions. The solution is strong solution in the probabilistic sense. The proof are constructive are based on the method of characteristics (in the presence of noise), Itô-Wentzell-Kunita formula and commutators.

References

[1] C. Olivera *Well-posedness of the non-local conservation law by stochastic perturbation*, Manuscripta Mathematica, https://doi.org/10.1007/s00229-019-01129-6, 2019.

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Challenges in the everyday, disabilities people and race, under the mathematical and probabilistic

Paulo Tadeu Meira e Silva de Oliveira

EESC/STT USP

Abstract:
Disability presents itself as a socially constructed phenomenon, and being "disability" is almost always relative to other people who do not have "disability." According to the WHO, it is estimated that about 15% of the world's population lives with some type of disability (2010 estimates). This number is lower than estimates from IBGE, of the same year, indicate that approximately 23.9% of the population of Brazil are disabled people. According to the 2010 IBGE Census, disability were divided into physical, hearing, visual and intellectual, and the first three, in terms of degree of severity were divided: 1) can not in any way; 2) can, but with great difficulty; 3) can, but with some difficulty; and finally; 4) presents no difficulty, and intellectual: 1) yes, if you have an intellectual disability and 2) not, if you do not have it. The most serious cases (those represented by groups 1 and 2 and all cases considered and intellectual disabilities) are considered as candidates for obtaining assistance and receiving benefits from public authorities. In this paper, however, we are considering all cases. Race is a social construction used to distinguish people in terms of one or more physical marks, among them color. The racial quotas are the reserve of vacancies in public or private institutions for blacks, browns and indigenous people. In mathematical and statistical terms, Probability represents a series of future events whose occurrence is defined by some random physical phenomena or represents our uncertainties about propositions when one does not have complete knowledge of causative circumstances. Conditional probability refers to the probability of an event A knowing that another B occurred. In this work, we will show results regarding disabilities people and races using data from the 2010 Demographic Census using concepts probability and conditional probability.

Infinite dimensional jump processes with degeneracies

Ioannis Papageorgiou

Universidade de São Paulo

Abstract:
We study the Galves - Löcherbach model introduced to model the activity of a biological neural network. In particular we investigate conditions about the interactions so that the model can be extended beyond the usual Dobrushin conditions.

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Convergence, in Mallows Distance, of the Empirical Process generated by random samples

Eliézer Soares Pereira; Wembesom Mendes Soares; Adriana Barbosa de Souza.

Instituto Federal de Braslia

Abstract:
The theme guides an ongoing Scientific Initiation and explores the association between the classical Empirical Process and the Gaussian distribution, and the additional relationship with the Adjustment Tests. The interest in Mallows metric is in its diffusion in statistical simulations. Part of this initiation is the oriented study of classical Probability topics and basic training in simulations. The partial results of the Research and the scope of your motivating problem will be detailed.

Shape theorem for the spread of epidemics

Graccyela R. Salcedo P.

Universidade Federal do Rio de Janeiro

Abstract:
This work is based on the study and comparison of the results of Cox and Durrett (1988), Zhang (1993) and Chabot (1998). They showed that if the epidemic spreads with positive probability, and assuming that initially only the origin is infected and the rest of the individuals are healthy, then the set of infected sites is linearly asymptotic to the boundary of a convex set that contains the set of points in immune state. This result is known as the "Shape Theorem".

Repelling random walks in complete graphs

Fernando Pigeard de Almeida Prado and Rafael Rosales

University of São Paulo

Abstract:
We are concerned with the clustering properties of $n \geq 2$ random walks competing for the vertices of a connected graph with $d \geq 2$ vertices. The transition probability from vertex i to vertex j of a walk decreases with the number of visits of the other walks to vertex j. In this sense, each walk tends to visit the vertices less visited by the other processes. We show that the processes empirical occupation measures converge (a.s.) to the limit set of the flow defined by a ODE. In addition, when $n = d = 3$, we show that the empirical occupation measures have arbitrarily small overlap (a.s.) if the repulsion among the walks is sufficiently strong. We conjecture that this holds true whenever $d \geq n$.

This work is a generalization of the one by Chen (2014), which only considers two walks competing for the vertices. We approach this problem by using stochastic approximation techniques as exposed by Benaïm (1999). The process studied here belongs to a wider family of processes know as reinforced processes, and has applications in population game theory, evolutionary dynamics, learning, and community detection in graphs among others.

Chen, J. Two particles' repelling random walks on the complete graph. *Electron. J. Probab.*, 19:17 pp., 2014.

Benaïm, M. Dynamics of stochastic approximation algorithms. Séminaire de Probabilités XXXIII, pp. 168, 1999.

Eigen-measures on generalized Markov shifts

Thiago Raszeja

University of São Paulo

Abstract:
Given a countable Markov shift Σ_A associtated to $0-1$ matrix A, the spectrum X_A of a certain C*-subalgebra of its corresponding Exel-Laca algebra includes Σ_A densely. We introduced the notion of conformal measures on X_A. We prove the renewal shift can present a phase transition undetected by the classical thermodynamic formalism for A not row-finite and f depending on the first coordinate: existence and absence of conformal measures μ_β associated to βf occurs for different β's with $\mu_\beta(\Sigma_A) = 0$. $f = 1$ presents a critical inverse of temperature $\beta_c = \ln 2$ for which there exists a unique conformal measure μ_β and $\{\mu_\beta\}_{\beta > \ln 2}$ converges weakly* to a classical conformal measure living on Σ_A.

Joint work with R. Bissacot, R. Exel and R. Frausino

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The Gaussian inequality concentration and the Bernstein inequality for empirical processes

Zoraida Fernandez Rico

Instituto de Matemática Pura e Aplicada

Abstract:
In this talk, we will present results concerning the Gaussian inequality concentration and the Bernstein inequality for empirical processes. We will provide an outline of the techniques used for the calculations. In this context, for the Gaussian inequality we present two proofs: the first one by Boucheron, Lugosi and Massart and can be deduced from the Gaussian Logarithmic Sobolev inequality and the Herbst's argument (with the optimal constant) and the second one by Maurey and Pisier. Finally, we describe the Bernstein inequality proof proposed by Boucheron, Lugosi and Massart as an application of the exponential Efron−Stein inequality.

Percolation on the randomly stretched lattice in $\mathbb{Z}^{\nvDash}$

Marcos Sá

Universidade Federal de Minas Gerais.

Abstract:
In this poster is considered a percolation model on the square lattice featuring columnar disorder. The model is defined in two steps: first the columns of $\mathbb{Z}^{\nvDash}$ are maintained/removed following a discrete renewal process with interarrival time given by ξ and, in the second step, the bonds connecting sites in the remaining sub-lattice are declared open with probability p independently. The main result of this poster shows that if $\mathbb{E}(\xi^{\nvDash+\varepsilon}) < \infty$ for some $\varepsilon > 0$ then $\mathbb{P}_{\shortmid}^{\Lambda}(\rtimes \leftrightarrow \infty) > \nvDash$ for some $p < 1$ and almost every realization Λ of the renewal process.

References

[1] Hilário, M. R.; Sá, M.; Sanchis, R. and Teixeira, A., *Percolation on the randomly stretched lattice in* $\mathbb{Z}^{\nvDash}$, in preparation.

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Uniqueness of the infinite cluster of inhomogeneous percolation with a defect plane

Humberto C. Sanna and Bernardo N. B. de Lima

Universidade Federal de Minas Gerais – UFMG

Abstract:
In 2015, G. K. Iliev, E. J. Janse van Rensburg and N. Madras studied the model of Bernoulli percolation on $\mathbb{Z}$, $d \geq 3$, in which every edge of the lattice has probability $p \in [0, 1)$ of being open, except for the ones lying inside the hyperplane $\mathbb{Z}^{\sim} \times \{\not\vdash\}^{-\sim}$, $2 \leq s < d$, which are assigned parameter $q \in [0, 1)$. We show the uniqueness of the infinite cluster in the supercritical phase for this model. The standard results in percolation theory do not account for this case since the probability measure of the present model is not invariant under any transitive group of automorphisms of $\mathbb{Z}$.

Stochastic Processes involved in the Ruin Theory

Thaís Miranda dos Santos; Adriana Barbosa de Souza; Wembesom Mendes Soares.

Instituto Federal de Braslia

Abstract:
In this work, the stochastic processes involved in the chaos theory will be presented to the scientific community. The theme guides an ongoing scientific initiation and explores the treatment in the theoretical model for the time evolution of the capital of an insurer in continuous time, essentially the so-called classical model that is based on a renewal process, specifically, the Poisson process as well as the study of risk theory. Our interest in this work will be to study the uncertainty of whether insurers are able to fulfill their obligations, that is, when the company needs to pay any of the claims. Part of this initiation is the oriented study of classical probability topics. The partial results of the research and the scope of its motivating problem will be detailed.

Near Optimal Controls for Stochastic Inventory Systems with a Demand rate driven by a Fractional Brownian Motion

Francys Andrews de Souza

IMECC-UNICAMP

Abstract:
In this talk we address the problem of optimal control in stochastic inventory model with deteriorating item and a demand rate driven by fractional brownian motion. The cost includes the sum of the holding cost of inventory and the production cost. The solution of the related optimal stochastic control problem will be carried out using the stochastic dynamic programming principle. Our methodology is based on the general stochastic optimal control theory developed by Leo, Ohashi and Souza[1]. The optimal stochastic control problem is discretized in such way that a optimal control for the discretized problem is also a near optimal control for the original problem. By applying this result, we derive near optimal controls for the stochastic inventory with deteriorating item.

References

[1] Leão,D. Ohashi, A. and Souza, F. (2018). Stochastic Near-Optimal Controls for Path-Dependent Systems. arXiv: 1707.04976.

Estimation of the number of communities in the stochastic block model

Cristel Ecaterin Vera Tapia

DEs-UFSCar/ICMC-USP

Abstract:
The Stochastic Block Model was introduced by Holland et all. (1983) and falls in the general class of random graphs. In this model, the nodes are classified in groups or communities, such that, considering to each node in the graph an associated latent discrete random variable describing its community label, the probability of existence of an edge connecting two nodes, depends only on the values of the latent variables. In this context, Cerqueira and Leonardi (2018) introduced the Krichevsky-Trofimov estimator for the number of communities in the stochastic block model. Based on these results, we consider in this work a simple extension of the classic stochastic block model to include the possibility of existence of a finite number of edges between each pair of nodes.

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Using the Birmbaun-Saunders distribution to model service time in fast queueing system

Marcio Luis Lanfredi Viola[a] and Silvia Maria Prado[b]

[a] Federal University of São Carlos- Department of Statistics

[b] Federal University of Mato Grosso- Department of Statistics

Abstract:
In this work, we propose a model for a specific queueing system where the service is very fast and the number of service channels is unknown. In this system, we are particularly interested to observe only the first opened server. The proposed model is a M/G/1 model where the distribution of the service is named of the Minimum-Conway-Maxwell-Poisson-Birmbaun-Saunders distribution (MINCOMPBS distribution). The estimation of the parameters is based on the usual maximum likelihood method and simulated data are used to study the characteristics of the proposed queueing model.

Cutoff for 1-D polymer dynamics interacting with an impenetrable substrate

Shangjie Yang

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Abstract:
In this paper, we consider the set of all one-dimensional nearest-neighbor paths on $\mathbb{Z}$ with nonnegative integer coordinates, starting at 0 and coming back to 0 after L ($L \in 2\mathbb{N}$) steps. Each path ξ has a weight $\lambda^{\mathcal{N}(\xi)}$, where $\lambda \geq 0$ is a parameter and $\mathcal{N}(\xi)$ is the number of zeros in ξ. This is the polymer pinning model interacting with an impenetrable substrate, and we investigate the mixing time of the corner-flip Glauber dynamics for this model. For $\lambda \in [0, 1]$, we prove that: around time $(L^2 \log L)/\pi^2$, the total variation distance to equilibrium of the Glauber dynamics drops abruptly from 1 to 0, which establishes the first cutoff for the Glauber dynamics of polymer models. This improves both the lower and upper bounds in [**?**] for $\lambda \in [0, 1]$. Moreover, for $\lambda \in (1, 2)$, we prove that the same phenomena hold for the Glauber dynamics starting with the two extremal paths.

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Random walks on path-generated evolving graphs

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Abstract:
Random walks on dynamic graphs have received increasingly more attention from different academic communities over the last decade. In this work we study a natural model of this kind, which generalize others appears in the recently literature. It works as follows: A walker starts in a graph with a single vertex and one self-loop. As usually he only jumps to vertexes which are connected to him by a edge. After s steps - for some fixed s - the walker adds a random number of new leaves to the vertex currently occupied by him. The amount of leaves added in each stage are i.i.d., let us say that follows the distribution of a random variable ξ. Here we study the recurrence and transient behavior of the walker when s is even in relation to the moments of ξ.