Posters

Adilson Simonis - IME-USP

Title: Gap Statistic for chains with complete connections.

Abstract: We discuss the representation as block processes, using the "gap statistic", of chains with complete connections whose interactions functions decay exponentially or polynomially.

Adriana Petrielli - IME-USP

Title: Data Mining.

Abstract: Data mining is defined as the process of extracting information, previously unknown and with maximum scope using large databases, in order to make crucial decisions. The Data Mining goes forward of simple database queries, because it allows to users exploring and deducing useful information from the database, discovering possible hidden relationships. A company that uses this tool is able to: Create parameters to understand the customers' behavior; Identify relationships between products and services choices; Preview shopping habits and trends; Analyze common behavior to detect frauds. The proactive data mining consists in the use of data set with a known characteristic to construct a model to preview the same characteristic in new cases. A common example is to construct a model, using historical data about bank customers, where the bank manager can have a good idea about the behavior of new customers.

Adriano Francisco Siqueira - IME-USP

Title: Formation and propagation of shocks in the Katz-Lebowitz-Sphon process in case epsilon close to 1.

Abstract: The KLS process, wich is an exclusion-type process whose rates depend on the given site, one nearest neighor before, two after and parameter epslion between 1 and -1. In general the KLS process is not attractive, and a family of invariante measures for this process are Markov chain. We can prove propagation of the picture with shocks splitting with resulting shocks away fron each other, when epsilon is close to 1, in the scale time $(1 - epsilon)^{(1/2)}$.

Ana Paula Azevedo Travassos - UFMG

Title: Problemas de Fronteira dos Núcleo-Estimadores e suas Abordagens.

Abstract: A suavização pelo método do núcleo é um difundido método não-paramétrico de estimação de uma função de densidade de probabilidade. Ele também é aplicado na estimação da função de intensidade de um processo de Poisson não-estacionário. Uma questão crucial na aplicação deste método é a determinação do parâmetro de suavização ou janela h, que controla a quantidade de suavização a ser feita. O método de validação cruzada para seleção de h tem sido amplamente estudado no contexto de estimação de densidade. No caso da estimação da função de intensidade, foi proposto um estimador que minimiza uma estimativa do erro quadrático médio sob a suposição de que os dados são gerados por um processo de Cox estacionário. Diggle e Marron (1988) mostram que esses dois métodos selecionam a mesma janela, apesar de serem motivados de formas bastante diferentes. Problemas de fronteira afetam os núcleo-estimadores quando o suporte da função a ser estimada é limitado. Sabe-se que o estimador é viciado, e que esse problema torna-se mais grave perto das fronteiras. O efeito da fronteira pode afetar também a estimação da janela ótima. Alguns dos métodos propostos para correção deste problema são o método de imagem espelhada e a abordagem usando transformações. Os objetivos deste trabalho são: testar o desempenho do estimador da janela ótima pelo método estabilizado de validação cruzada no contexto de estimação da função de intensidade, e comparar o desempenho de algumas técnicas de correção dos problemas de fronteira.

Anish Sarkar - Assistant Professor, Indian Statistical Institute

Title: Random oriented tree: a model drainage networks.

Abstract: Consider the d-dimensional lattice $\mathbb{Z}^d$ where each vertex is 'open' or 'closed' with probability p or $1 - p$ respectively. An open vertex v is connected by an edge to the closest open vertex w such that the dth co-ordinates of v and w satisfy $w(d) = v(d) - 1$. In case of non-uniqueness of such a vertex w, we choose any one of the closest vertices with equal probability and independently of the other random mechanisms. It is shown that this random graph is a tree almost surely for $d = 2$ and it is a infinite collection of distinct trees for $d \geq 4$. In addition, for anydimension, we obtain central limit theorems of (a) the number of vertices of a fixed degree ν and (b) of the number of edges of a fixed length l. These results are obtained by using the martingale convergence theorem and a coupling of the process with independent random walks.

Antônio Galves - IME-USP

Title: Sonority as a basis for rhythmic class discrimination.

Abstract: Recently, several papers, starting with Ramus, Nespor and Mehler (1999), gave evidence that simple statistics of the speech signal could discriminate between different rhythmic classes.In the present paper, we propose a new approach to the problem of finding acoustic correlates of the rhythmic classes. Its main ingredient is a rough measure of sonority defined directly from the spectrogram of the signal. This approach has the major advantage that it can be implemented in an entirely automatic way, with no need of previous hand-labelling of the acoustic signal. Applied to the same linguistic samples considered in RNM, it produces the same clusters corresponding to the three conjectured rhythmic classes. This is a joint work with Jesus Garcia, Denise Duarte and Charlotte Galves.

Ariane Machado Lima - IME-USP

Title: Laboratory for automatic generation of classifiers for sequences.

Abstract: This is about a framework for the implementation of inference algorithms for stochastic grammars. This framework includes supporting software for the automatic generation of classifiers for sequences. The final goal of the system is to be used in the development of new classifiers for genetic sequences.

Arlene Guimarães Leite - UFMG

Title: A Generalized Empireical Bayesian Estimator for the Total Number of Distinct Species in a Finite Population.

Abstract: The estimation of the total number (S) of distinct species in a finite population is discussed when quadrat sampling is used. For a random sample of n quadrats, let Xi be the number of quadrats where the species si is observed, i=1,2,...,S. The Xi is assumed to have a Generalized Binomial distribution (Madsen,1993) with parameters (n,pi,ro) where pi has a Beta distribution, ro is the correlation coefficient between Xi and Xj, i different from j. In this context a generalized Bayesian empirical estimator for S is derived. It can be shown that this new estimator is an extension of the empirical Bayesian estimator proposed by Mingoti & Meeden (1992).

Beat Niederhauser - IME-USP

Title: Norms of random matrices.

Abstract: We consider large random matrices which are generalisations of sample covariance matrices and give bounds on the largest eigenvalue. The proof is based on ideas going back to Furedi and Komlos, using a graph representation of the trace of large powers of the matrices.

Cristian Favio Coletti - Fa.M.A.F. U.N.C. Argentina

Title: Stochastic Processes Generated By Exponential Dispersion Families.

Abstract: Exponential dispersion families formalize the exponential type of error proposed by Nelder and Wedderburn and is one of the two main subclasses of Dispersion Models. A convolution formula is the key to infer results on infinite divisibility and stochastic processes. Precisely, The importance of exponential dispersion families is their interpretation in terms of such processes. In the present work, many exponential dispersion families are characterized, which are then used to construct a stochastic process with independent and stationary increments. Special attention is payed to stochastic processes generated by families closed with respect to scale transformation. Such families are called Tweedie. Later, these families found applications in many areas. Also, some results on convergence and infinite divisibility are shown.

Daniel Fraiman - Departamento de Fisica, Universidad de Buenos Aires

Title: A stochastic model for the InsP3 receptor.

Abstract: Relying on quantitative measurements of Ca+2 activation and inhibition of the inositol 1,4,5-trisphosphate receptor) we have constructed a novel stochastic model of the channel. Our model describes almost all single channel properties of the type 1 InsP3R that have been reported in the literature. In particular, the model displays the observed dependence of the open probability of the channel with [Ca+2] c , [IP3] c and ATP and gives values for the dwell times that agree with the observations. Furthermore, the model is able to reproduce the changes of the open probability with the luminal calcium concentration, [Ca+2] l that have been reported recently (Foskett). Based on these last observations, we have found an explanation of why the open probabilities reported by Erlich and Foskett might be so different.

Daniel Vieira - IME-USP

Title: Building genetic sequences classifiers with regular grammars.

Abstract: Computational methods have been used in Molecular Biology in order to identify genoma features. A linguistic approach for nucleotidic sequences is used to generate sequence classifiers. The intention is to develop a computer system of learning machine which regular grammatical inference algorithms (a special case of Hidden Markov Models) will be implemented to characterize sets of nucleotidic sequences. These algorithms are used to build syntactic parsers which will be utilized to generate sequence classifiers. In a second phase, these classifiers generated by the system will be applied to infer, by similarity, unknown features of nucleotidic sequences.

Denise Duarte - IME-UFG and IME-USP

Title: Bootstrapping and Central Limit Theorem.

Abstract: The motivation of this paper is to construct confidence intervals for estimates of the average sonority across languages. A model for discretized sonority is a chain of infinite order taking values on a finite alphabet with rapid decay of correlations. Central limit theorems under these hypothesis already exit in the literature. However these important theoretical results have small practical utility since the limiting Gaussian distribution has a variance which is usually unknown. Efron's bootstrapping suggests a practical way to surmount this difficulty. Until now rigor-

ous results in this direction have only been established for Markov chains. The main result of the present paper is to establish the validity of the bootstrapping approach for chains of infinite order.

Elier Broche Cristo - IME-USP

Title: Métodos Estatísticos na Análise de Experimentos de Microarray.

Abstract: Este projeto propõe um estudo comparativo de diversos métodos estatísticos disponíveis para análise de dados de microarrays. Esta análise será feita com base em dados experimentais gerados dentro do projeto CAGE e fora dele, com suporte da infra-estrutura do BIOINFO/USP. Como resultado deste estudo pretendemos escolher um conjunto de procedimentos mais adequados para a obtenção de bons estimadores para níveis de expressão gênica e implementá-los através de ferramentas computacionais adequadas.

Fernando Pigeard de Almeida Prado - IME-USP

Title: Self-Organizing Market Crashes Resulting from Agents' Interaction.

Abstract: In this poster we present an interacting-agent model of the speculative activity explainig bubbles and crashes in stock markets. The model presented has been constructed via developing the ideas of E.Glaeser and J.A.Scheinkman and T.Kaizogi. - T.Kaizoji describes stock markets through an infinite-range Ising Model. The states +1 and -1 of each lattice site in the Ising Model mimics traders attitude buy and sell. The magnetization corresponds consequently to the excess demand which can drive the market upwards (excess demand positive) or downwards (excess demand negative). On the other hand according to the E.Glaeser and J.A.Scheinkman model each agent's utility depends on his own action and on the population average action. The key idea in this model is to give an additional utility that each agent has by taking one of two possivle actions. This additional utility and its distribution (part of the model) are based stricktly on individual preferences and play a key role in the model. Our model uses the ideas of E.Glaeser and J.A.Scheinkman to model the two discrete action choisces: to demand (+1) or to offer (-1) a stock unit. Like in Kaizoji's model the resulting mean-field equilibrium corresponds to the excess demand of equilibrium. Bubble and crash phenomena occur in a similar manner. This combined approach opens, for example, the possibility to study high price volatility as a phenomenon in which the randomenes in the behaviour of traders is in an appropriate relationship

to the degree of interaction between traders. Additionally we proposed an explicit decision rule for the determination of an unique mean-field equilibrium at each time, when more than one mean field equilibrium prevail. As a consequence we got a well defined stochastic process which explains the price dynamics in fundamental markets and in expeculative markets. In this model the price will converge to the stock fundamental value, if the degree of interaction between traders does not exceed a specific threshold, otherwise we will get an infinite sequence of market crashes.

Flávio Henn Ferreira - IME-USP

Title: Generating Correlated Binary Variables.

Abstract: We discuss several flexible methods for simulating random binary sequences with fixed marginal distributions and specific degrees of association between the variables.

Frederico Zanqueta Poleto - IME-USP

Title: Uma Aplicação de Equaçães de Estimação Generalizadas para Dados de Contagem.

Abstract: Neste pôster serão apresentados modelos para a análise de dados de contagem cuja estimação foi feita utilizando-se equações de estimação generalizadas (EEG). Trata-se de uma técnica que permite a estimação de modelos de regressão multivariados sem a necessidade de se conhecer a distribuição de probabilidades geradora dos dados. Os estimadores serão consistentes e assintoticamente normais sob condições gerais de regularidade.

Geraldine Goes Bosco - IME-USP

Title: On the connectedness of a random graph.

Abstract: A survey of results concerning the connectedness of a random graph. Our random graph has vertex set Z and edge set defined as follows: for each pair i,j in Z where i is less equal than j, there is an edge between i and j with probability p(i-j), independently of the presence or absence of all other edges. References: 1. Percolation, G. R. Grimmett, second edition. 2. G. R. Grimmett, M. Keane and J. M. Marstrand, Math. Proc. Camb. Phil. Soc. (1984), 96, 151. 2. S. Kalikow and B. Weiss, Isr. J. Math. 11 (1972), 328-345.

Gregorio Saravia Atuncar - Departamento de Estatística - UFMG

Title: A Consistent estimator of the Optimal Bandwidth: The Distribution Function Case.

Abstract: We propose an estimator of the optimal bandwidth to be used in the definition of the kernel estimator of the distribution function. By using characteristic function and results from the analysis, we prove that this estimator is strongly consistent in the i.i.d. case. By using the results of this work we improve the Tajima´s test. Tajima´s test is based on the assumption that the statistic defined in the test follows a beta distribution, but from some simulations results it was found that this assumption in some cases is no correct. In those cases we define the critical region by using kernel estimator. This is a joint work with Lupercio Bessegato and Luiz Duczmal.

Gustavo Barbagallo de Oliveira - IF-USP

Title: Persistência da Natureza Espectral em Matrizes Infinitas.

Abstract: Seja D uma matriz diagonal e infinita cujo espectro é puramente pontual e denso em R. Considere a matriz H = D + P, onde P é uma perturbação (sob certas hipóteses). Utilizando uma técnica do tipo KAM, demonstramos que o espectro da matriz perturbada permanece puramente pontual se P for "pequeno"num sentido apropriado. O presente trabalho é o ínicio de um projeto que visa aplicar as idéias de Grupo de Renormalização em problemas cuja série perturbativa apresenta pequenos denominadores.

Janaisa Martins Viscardi - UNICAMP

Title: Classifying languages according to a rough measure of sonority.

Abstract: Using simple statistics applied to a great number of annotated sentences by different speakers in 8 languages, RNM provided evidence that languages can be discriminated according to their rhythm. In this poster, we present a new approach to the problem of finding acoustic correlates of the rhythmic classes, based on the idea that children can discriminate languages of different groups using information below 800 kHz. The major advantage of the tool is that it can be implemented with no need of previous hand-labelling of the acoustic signal.

Jesus Enrique Garcia - IME-USP

Title: Vocale a Semi-Automatic Tool for Prosodic Research.

Abstract: We will talk about the use of relative entropy on speech signal samples to indentify vocalic and consonantal intervals.

José Gregorio Marcano - Universidad de Carabobo

Title: The Arov-Grossman Model and the Burg Multivariate Entropy.

Abstract: In this paper we deal with the Arov-Grossman functional model to describe all the solutions of the Covariance Extension Problem for q-variate stationary stochastic processes and we find the density that maximizes the Burg Multivariate Entropy. This description is based on a one-to-one correspondence between the set of all solutions of the Covariance Extension Problem and the set of all contractive analytic functions $\mathbf{H}$ from the open unit disk with values on the space of $q \times q$ matrices. With this correspondence, the density that maximizes the Burg Multivariate Entropy corresponds to the function $\mathbf{H} \equiv \mathbf{0}$. Also, from the information that the Arov-Grossman functional model provides we obtain a version of the Levinson algorithm. The partial autocorrelation coefficient matrices are computed directly from Levinson's recursions.

Juan Carlos Raúl Soto Sotelo - IME-USP

*Title:*A comparative study of the methods to determine the order of a Markov Chain.

Abstract: We presented results related to the performance of AIC,BIC, Bayes Factor and EDC in small and large samples of chains of markov of order k. Joint work with Pablo Ferrari.

Juan Carlos Ruilova - IME-USP

Title: Resultados Assintóticos na Regressão não Paramétrica.

Abstract: Se amostram os métodos de regressão não paramétrica mais usados, seus aplicações, possíveis melhoras e os resultados teóricos obtidos de consistência e convergência em distribuição.

Juvêncio Santos Nobre - IME-USP

Title: Distribuição Em Série de Potências: Um Caso Geral.

Abstract: Na disciplina de Probabilidade I, ministrada aos alunos do curso de Estatística da Universidade Federal do Ceará, são estudadas as principais variáveis aleatórias discretas. Foi observado no decorrer dos anos, que os alunos desta disciplina encontram uma certa dificuldade para absorver os conceitos ministrados em sala de aula, relacionados com estas variáveis, O que nos motivou a desenvolver este trabalho, que tem como principal objetivo é servir de suporte didático para os alunos da disciplina, no estudo das variáveis aleatórias discretas. A distribuição em Série de Potências generaliza as principais variáveis aleatórias discretas: Bernoulli, Binomial, Geométrica, Binomial negativa(Pascal), Logarítmica e ainda as distribuições Binomial Truncada e Poisson Truncada. O objetivo deste trabalho é mostrar esta generalização bem como algumas utilizações da distribuição em Série de Potências em Inferência Estatística. A grande vantagem em se estudar a distribuição em Série de Potências é de que, para determinarmos as funções geradoras (de momentos, de cumulantes, de probabilidades), bem como sua função característica, e seus momentos (centrais, centrados na origem, fatoriais) de todas as variáveis aleatórias discretas já citadas basta encontrarmos as respectivas funções geradoras e os momentos da distribuição em Série de Potências, o que acarreta uma maior facilidade. Este trabalho fez parte das atividades do programa de monitoria da disciplina de Probabilidade I do Departamento de Estatística e Matemática Aplicada do Centro de Ciências da Universidade Federal do Ceará no primeiro semestre de 2000. Trabalho em co-autoria com João Maurício de Araújo Mota.

Krerley Oliveira - IMPA

Title: Equilibrium states for non-uniformly expanding maps.

Abstract: We prove the existence of equilibrium states for a large (open) class of non-uniformly expanding maps. We obtain the unicity of the maximal entropy measure for these systems, also some of its ergodic properties.

Laura L. Ramos - IME-UNICAMP

Title: Perfect Simulation of some Reversible Jump Markov Chains.

Abstract: The main subject concern the multiple change-point problem for Poisson processes in $[0, \infty)$, where the intensity, $\lambda(t)$, is supposed to be a simple function,

that is,

$$\lambda(t) = \sum_{i=1}^{K} H_i I_{[S_i \leq t < S_{i+1}]}, \quad 0 \leq t \leq T, \tag{1}$$

with unknown number of changes, K. The times S_i and the rates H_i are also unknown. Consider the parametric space

$$\Theta = \bigcup_{k=1}^{\infty} \{k\} \times \Theta_k \,,$$

where $\Theta_k = \{(h_1, s_1, \ldots, h_k, s_k) \in R^{2k} : 0 < s_1 < s_2 < \ldots < s_k < L, h_i > 0, h_i \neq h_{i+1}\}$, for fixed L. Each $2k$-dimensional vector, θ_k, defines a non-homogeneous Poisson process with rate h_i in the interval $[s_i, s_{i+1})$. Bayesian inference about K and $(S_1, H_1, \ldots, S_K, H_K)$ from data by will be based on the joint posterior $p(k, \theta_k/by)$. This distribution can be regarded as the invariant measure of a certain birth-and-death process on $R \times R^{2k}$. This allow us, therefore, to apply a perfect simulation scheme to obtain a sample from $p(k, \theta_k/by)$.

Luis Rodríguez - Dep. Matemáticas - Universidad de Carabobo

Title: Estabilidad y Estimación en Procesos ARF-RM.

Abstract: Se estudiaron condiciones para establecer teoremas de existencia y unicidad de una solución estrictamente estacionaria para el modelo autorregresivo funcional bajo régimen Markoviano ARF-RM y se propone un algoritmo tipo EM para la estimación paramétrica.

Luiza Figueiredo Pagliari - IME-USP

Title: Statistical Analysis and Identification of Rhythmic Classes on Big Speech Corpora.

Abstract: We identify the rhythmic classes of a set of languages including Brazilian and European Portuguese, English, Dutch, Polish, Spanish, French, Catalan and Japanese. This caracterization has been done using the sonority function, continuing the approach used by Galves, Garcia, Duarte and Galves (2002), except that now we identify the rhythmic classes through the statistical analysis of a big set of data.

Marcos Antônio da Cunha Santos - IME-USP

Title: A Peierl's contours sampler algorithm.

Abstract: We introduce an algorithm that counts the numbers of SAP's - Self-Avoiding Polygons - in a square lattice. Giving a rectangle with N columns x M rows the output of the algorithm is the exact number of SAP's contained with n edges, for n less than or equal to NxM. The method can be extended to count Peierl's contours, and used to amostrate uniformly these objects, accordingly their weights, calculated by the algorithm. We then use the method to sample a Peierl's contour from the measure that to any given contour gamma contained in the box [0,N] x [O,M] gives weight exp(-beta*—gamma—), where beta is a fixed parameter called inverse temperature and —gamma— is the number of edges of gamma.

Maria Soledad Torres Diaz - Universidad de Valparaiso, Chile

Title: Reflected BSDE with super-linear quadratic coefficient.

Abstract: We provide existence of reflected solution of one dimensional backward stochastic differential equation when the coefficient is continuous, has a super-linear growth in y and quadratic growth in z. We also give a caracterisation of the solution as the value function of an optimal stopping time problem. Finally, we give an application of quadratic RBSDEs to the pricing of American contingent claims in an incomplete market.

Marina Vachkovskaia - IMECC-UNICAMP

Title: On a many-dimensional random walk in a rarefied random environment.

Abstract: We consider a modification of the Simple Random Walk (SRW) which can be described as follows. Initially, any $x \in \mathbf{Z}^d$ becomes "special" with probability $p(x)$; then, in all special sites we modify the transition probabilities in order to create a drift which is directed outwards the origin (in the case of one- or two-dimensional SRW) or towards the origin (for higher dimensions). Then, based on the asymptotical behaviour of the function $p(x)$, we give some sufficient conditions for transience and recurrence. This is a joint work with M.V. Menshikov, S.Yu. Popov and V. Sisko.

Mauricio Zuluaga Martinez - IME-USP

Title: Um espaço de Banach que não contem c_0, nem l_1, nem nenhum subespaço reflexivo.

Abstract: O objetivo é estudar um (o primeiro) espaço de Banach de dimensão infinita que não contém uma cópia de c_0, nem uma cópia de l_1, nem nenhum subespaço reflexivo de dimensão infinita.

Nevena Maric - IME-USP

Title: Better theoretical bounds for perfect simulation of loss networks.

Abstract: Sufficient conditions for ergodicity of a continuous one-dimensional loss networks on R with length distribution G and cable capacity C are found. These processes are spatial birth-and-death processes with an invariant measure which is absolutely continuous with respect to a Poisson process and we implement the perfect simulation scheme based on the clan of ancestors introduced by Fernández, Ferrari and Garcia (2002) to obtain perfect samples viewed in a nite window of the in nite-volume invariant measure. Moreover, by a better understanding of the simulation process it is possible to get a better condition for ergodicity.

Nikolai Kolev - IME-USP

Title: Correlated Random Sums and Applications.

Abstract: We study the ranom sum $Y_1 + \cdots + Y_N$ under assumption that N and $(Y_1, \ldots, Y_N)$ are independet and $(Y_1, \ldots, Y_N)$ are identically distributed but equally corelated. Applications in terms of the collective risk model will be given.

Pablo Ferrari - IME-USP

Title: Poisson Trees.

Abstract: We show how to construct a unique tree having as vertices the points of a homogeneous Poisson process in R^2 or R^3. The tree is shown to be connected and with finite branches. This allows to find a bijection between the points of the Poisson process and the natural numbers. In more dimensions our construction gives a forest with infinitely many trees. Joint work with H. Thorisson and C. Landim.

Paola Siri - Università di Verona

Title: Bond diffusion in inhomogeneous random environment: the one dimensional case.

Abstract: We consider a nearest neighbors random walk on $\mathbb{Z}$. The jump rate from site x to site $x+1$ is equal to the jump rate from $x+1$ to x and is a bounded, strictly positive random variable $\eta(x)$. We assume that $\{\eta(x)\}_{x\in\mathbb{Z}}$ are independent and that the expectation of $\eta(x)^{-1}$ is a slowly varying function of x, i.e. $<\eta(x)^{-1}>= a(\varepsilon x)^{-1}$, where a is a smooth function on $\mathbb{R}$ and $\varepsilon > 0$ is the scale parameter. We prove that, under diffusive scaling of space and time, the random walk converges in distribution to the diffusion process on $\mathbb{R}$ with infinitesimal generator $\frac{d}{dX}(a(X)\frac{d}{dX})$. The main tools of the proof are a local ergodic result and the explicit solution of the corresponding Poisson equation. The proof is also extended to weakly mixing environments and to the more general case of locally ergodic distributions. This is a joint work with S. Olla.

Rafael A. Rosales - Department of Mathematics, IVIC.

Title: MCMC for Aggregated Hidden Markov Models.

Abstract: We present a Markov chain Monte Carlo algorithm for aggregated hidden Markov models. We consider a standard hidden Markov model where the realization of the underlying process is not directly observed. Moreover we partition the state space into a finite number of classes and at a given time, it is only possible to observe wich class the process is in. These models are widely used in biophysical applications and may prove to be usefull in bioinformatics. Uniform ergodicity of the MCMC sampler and also a CLT for the associated Monte Carlo estimates are obtained.

Suzi Alves Camey - IME-USP

Title: Modeling of sonority contours in natural languages using Hidden Markov Model(HMM).

Abstract: This is a work in progress. We will use HMM to model sonority contours. This will be done with original data produced by CNPq project "Probabilistic Tools for Pattern Identification Applied to Linguistics".

Thales Santos Teixeira - IME-USP

Title: Determining the optimal number of clusters through the gap statistics.

Abstract: The gap statistic defined in the estimation of the optimal number of clusters for methods such as the k-means and the hierarchical one, was recently introduced in 2001 in the article "Estimating the number of clusters in a data set via the gap statistics"(Tibshirani, Walter e Hastie, Jornal of the Royal Statistics Society, 63 Part 2, pp. 411-423). The authors' method consists in the estimation of the adequate number of clusters by means of the difference between the expected value of the logarithm of the weighted sum of the distances with-in the clusters (Wk), calculated over a reference distribution of data, and Wk. In this article, many simulations were done comparing this technique with others known. As part of the development of the masters degree in statistics program at IME-USP, under advisory of Prof. Adilson Simonis, we propose to implement new simulations on a different data base, aside from presenting some variations for the results of Tibshirani, Walter and Hastie, such as considerations on the modeling of stochastic evolution in time of the data.

Thomas Logan Ritchie - IME-USP

Title: Improved Lower Bounds for the Critical Probability of Oriented-Bond Percolation in Two Dimensions.

Abstract: We present a coupled decreasing sequence of random walks on Z that dominates the edge process of oriented-bond percolation in two dimensions. Using the concept of "random walk on the strip", we construct an algorithm that generates an increasing sequence of lower bounds that converges to the critical probability of oriented-bond percolation. Numerical calculations of the first ten lower bounds thereby generated lead to an improved, i.e. higher, rigorous lower bound to this critical probability, viz. pc greater than 0.63328.

Ulisses Umbelino dos Anjos - IME-USP

Title: Equivalent Martingale Measures and Application in Option Pricing.

Abstract: We consider three models: log-normal, linear diffusion and Ornstein-Uhlenbeck. Equivalent martingale measures are determined. Applications in option pricing are given.

Vanderlei da Costa Bueno - IME-USP

Title: Analysing The Barlow and Proschan Reliability Importance Under Dependence Conditions.

Abstract: Birnbaum (1969) defined the reliability importance of a component in a system as follows. Let T and Ti denote the random lifetimes of the system and component respectively. Then the importance of Ti for T at time t is $IB(i,t) = P(T > t|Ti > t) - P(t > t|Ti > t)$. This measure depends on a given point t in time and it is not quite relevant for most design or redesign decisions. Several time independent importance measures have been suggested, and most of them are weighted integrals of $IB(i,t)$ over t. Barlow and Proschan (1975) defined a time independent reliability importance of component i to system reliability as $E[IB(i, Ti)]$. Its well known that there exists a bijective relation between the classe of all distribution functions and the class of the compensator processes related with the natural sigma algebra (Norros (1986)). To consider the dependence between the components and the structural dependence we use this relation to propose a importance measure through compensator processes. Its happen that this measure coincides with Barlow and Proschan importance measure.

Viviana Beatriz Lencina - IME-USP

Title: Small Area Estimation Using Design Based Model.

Abstract: We obtain an optimal estimator for the total of a small area under the linear least-squares prediction approach applied to a design based model. The optimal estimator is the same as that obtained using a superpopulation approach under a one-way analysis model, and leads to the classical synthetic estimator in an extreme case. In this paper we also obtain an optimal estimator of the vector of totals of different small areas, using unbiasedness and M-minimization of prediction MSE as optimization criterion.

Vladimir Belitsky - IME-USP

Title: Implicit coefficient of extreme dependence and its application in finance.

Abstract: We construct a characteristics of dependence between extreme values of two random variables. This coefficient stems from a comparison of quantiles of linear combinations of these variables with quadratic form compounded of quantiles of the

variables. This coefficient is then used to characterize the co-motion of different assets and markets.

Wilson José Vieira - Institute for Advanced Studies, CTA/IEAv

Title: Monte Carlo Simulation of Bayesian Networks.

Abstract: The "Asia Medical Example" was first proposed by Laurentzen and Spiegelhalter (1988) to illustrate the use of Bayesian networks. The problem is a simplified tool for diagnosis of patients with pulmonary problems. In this work we use a rejection Monte Carlo (Rubinstein, 1981) algorithm to provide all the possible solutions given by a belief network. The probabilities visited or did not visited Asia, smoker or non-smoker and others can be entered as evidences as in the belief network program (Hugin, 2000). We conclude that the use of Monte Carlo gives more insight into the analysis of the problem, rather than the abstract treatment of the Bayesian inference method, especially when the given evidences require the calculation of inverse probabilities that do not have a direct interpretation. [1] Laurentzen, W.;Spiegelhalter, J. "Local Computation with probabilities on graphical Stuctures and their application to expert Systems", Journal of Royal Statistics Society B, nr.50(2), pag. 157-194, 1988. [2] Rubinstein, R. Y., "Simulation and the Monte Carlo Method", John Willey & Sons, 278 p, 1981. [3] Hugin GUI Version, Hugin Expert A/S, Denmark, 2000 [http//www.hugin.com].