Journée Equipe 2 LMBA UMR CNRS 6205

Systèmes dynamiques, probabilités et statistique

Quimper le vendredi 5 juillet 2013

– **9h30** : Accueil dans la salle A102-1er étage du Pôle universitaire Pierre Jakez Helias, 18 avenue de la Plage des Gueux, 29018 Quimper

– **10h00** : **De-Jun Feng, Department of Mathematics, The Chinese University of Hong Kong** (45mn + questions)

  – Title : Multifractal analysis of self-similar measures and self-affine measures

  – Abstract : Multifractal measures and dimension spectra were first proposed by physicists in last 70-80's to describe various multifractal models arising from natural phenomena. A heuristical principle (the so-called multifractal formalism (MF)) were claimed by them that the dimension spectrum of a generic measure coincides with the Legendre transform of its L^q-spectrum. So far the MF has been verified rigorously for a large class of "good" measures, including Gibbs measures in conformal dynamical systems and self-similar measures satisfying the open set condition. In this talk, I will give a survey of the recent development in the study of multifractal structures of overlapping self-similar measures and self-affine measures.

– **11h00** : **Chloé Friguet, Université de Bretagne Sud** (45mn + questions)

  – Title : Multiple testing and variable selection in high dimension

  – Abstract : In many applications, modern technologies generate extremely large and

complex datasets, characterized by their high-dimension, as the number of measured features is close to several thousands whereas the sample size is about some tens. In such framework, the usual statistical approaches to analyze data are questioned and can lead to misleading decisions. New statistical methodology, and accompanying theory, have emerged in response. Motivated and illustrated by issues raised by the analysis of gene expressions data, the work presented here deals with multiple testing and feature selection in classification issues. More precisely, we focus on the negative impact of data heterogeneity on the properties of multiple testing procedures, and on the stability of supervised classification model selection which is often used to identify relevant subsets of features.

– Key words : High-dimension, dependence, multiple testing, feature selection

– **12h00-14h00 : Déjeuner au potager de Lanniron (http ://orangerie.lanniron.com/le-restaurant/plan-dacces-potager-de-lanniron/)**

– **14h00 : Vladimir Vatutin, Steklov Mathematical Institute, Moscow, Russia** (45mn + questions)

– Title : Two-type branching processes evolving in asynchronous random environments (jointly with Prof. Liu Quansheng).

– Abstract : A pure decomposable two-type branching process in an asynchronous random environment is considered under the quenched approach. We suppose that particles of this process produce offspring of their own type only and that the restriction of the evolution of the population to any of the two types leads to a single-

type branching process evolving in random environment generated by a sequence of independent probability laws. Assuming that both processes are (individually) critical and that the logarithms of the mean number of offspring of different types are negatively correlated in each generation, we prove a Yaglom-type conditional limit theorem for the number of individuals in the process at a distant moment given survival of both types up to this moment and show that, contrary to the ordinary critical Galton-Watson processes the population sizes of both types are subject of asynchronous oscillations. The model under consideration may be treated as a predator-pray model in random environment where large mean number of children in the predator population in generation n leads to small mean number of children in the pray population in the next generation and vice versa, small mean number of children in the predator population in generation n leads to large mean number of children in the pray population in the next generation.

– **15h00** : **Daniel Kious, Institut de Mathématiques de Toulouse, Université Paul Sabatier, Toulouse** (45mn + questions)

  – Titre : Stuck Walks : une conjecture d'Erschler, Tóth et Werner /Title : Stuck Walks : a conjecture of Erschler, Tóth and Werner

  – Résumé : En 2010, Erschler, Tóth et Werner ont présenté, dans *Stuck walks*, une classe de marches aléatoires inter-agissantes sur $\mathbb{Z}$, dans lesquelles apparaît une compétition entre répulsion à petit distance et attraction à plus grande distance. Ils ont prouvé que, pour tout entier $L \geq 1$, si le paramètre α appartient à un certain

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intervalle (α_{L+1}, α_L), alors ces marches se localisent sur $L+2$ sites avec probabilité positive. Ils ont également émis la conjecture que cela se produit presque sûrement. Nous démontrons partiellement cette conjecture, en prouvant que la marche, sous les mêmes hypothèses, se localise sur $L+2$ ou $L+3$ sites presque sûrement. Nous prouvons également que, si $\alpha > 1$, alors la marche se localise p.s. sur 3 sommets.

– Abstract : In 2010, Erschler, Tóth and Werner introduced the so-called Stuck Walks, which are a class of self-interacting random walks on $\mathbb{Z}$ for which there is competition between repulsion at small scale and attraction at large scale. They proved that, for any $L \geq 1$, if the parameter α belongs to a certain interval (α_{L+1}, α_L), then such random walks localize on $L+2$ sites with positive probability. They also conjectured that it is the almost sure behavior. We prove this conjecture partially, stating that the walk localizes on $L+2$ or $L+3$ sites almost surely, under the same assumptions. We also prove that, if $\alpha > 1$, then the walk localizes a.s. on 3 sites.

– **16h00** : Discussion autour d'un café/jus de fruit