

SÉMINAIRE DE MATHÉMATIQUES ACTUARIELLES ET FINANCIÈRES

organisé par Quantact, le Laboratoire de mathématiques actuarielles et financières du CRM

PK-5115
201, avenue du Président-Kennedy, Montréal
Département de mathématiques, UQAM
15 mai 2015, 11:00-16:30

Maciej Augustyniak

Université de Montréal

Estimation du modèle GARCH à changement de régimes

11:00-12:00

Le modèle GARCH à changement de régimes combine une structure GARCH avec des paramètres qui varient dans le temps. Cette flexibilité donne malheureusement lieu à un problème de *path dependence* qui complique l'estimation du modèle. Ce problème a mené à l'introduction de méthodes computationnelles intensives et à des techniques plus simples basées sur une approximation du modèle, connues sous le nom de *collapsing procedures*. Cet article développe une méthodologie originale permettant d'estimer le modèle GARCH à changement de régimes par le maximum de vraisemblance. La méthodologie proposée se base sur une généralisation ainsi qu'une amélioration des approches dites par *collapsing* et permet d'établir un lien entre ces approches et le filtre particulaire, démontrant ainsi qu'elles sont équivalentes à un filtre particulaire déterministe. Des études par simulations et empirique révèlent que la méthodologie proposée parvient à estimer le modèle avec précision et rapidité. En collaboration avec Mathieu Boudreault et Manuel Morales.

Matt Davison

University of Western Ontario, Canada

Dynamic Programming results in Green Energy Storage

14:00-15:00

Green Energy solutions to current world energy problems involve intermittent energy technologies like wind or solar. As such, storage technologies are needed. Simple models of economic incentives that can be used to encourage energy storage are presented in the context of dynamic programming methods. This talk will be at an accessible level to quantitative finance specialists, actuaries, statisticians, and mathematicians.

Jose Maria Sarabia

University of Cantabria, Espagne

Modelling Dependent Pareto Distributions with Applications in Risks Aggregation

15:30-16:30

The Pareto distribution has long been used as a suitable model for many non-negative economic variables, including losses and other variables in risk analysis. In this talk we review and study several proposals of multivariate dependent Pareto distributions, and we discuss some applications in risks aggregation. We begin reviewing several classes of multivariate distributions constructed using different methodologies and we propose some new classes. Then, we consider aggregated risks with multivariate dependent Pareto type II distributions. We study the individual and the collective risk models based on dependence. We consider some relevant collective models with Poisson and negative binomial as primary distributions. Finally, an application with real data is given.

SEMINAR OF ACTUARIAL AND FINANCIAL MATHEMATICS

organized by *Quantact, the CRM Laboratory of Actuarial and Financial Mathematics*

PK-5115
201, avenue du Président-Kennedy, Montréal
Département de mathématiques, UQAM
May 15 2015, 11:00-16:30

Maciej Augustyniak

Université de Montréal

Maximum likelihood inference for the Markov-switching GARCH model

11:00-12:00

The Markov-switching GARCH model allows for a GARCH structure with time-varying parameters. This flexibility is unfortunately undermined by a path dependence problem which complicates the parameter estimation process. This problem led to the development of computationally intensive estimation methods and to simpler techniques based on an approximation of the model, known as collapsing procedures. This article develops an original algorithm to conduct maximum likelihood inference in the Markov-switching GARCH model, generalizing and improving previously proposed collapsing approaches. A new relationship between particle filtering and collapsing procedures is established which reveals that this algorithm corresponds to a deterministic particle filter. Simulation and empirical studies show that the proposed method allows for a fast and accurate estimation of the model. Joint work with Mathieu Boudreault et Manuel Morales

Matt Davison

University of Western Ontario, Canada

Dynamic Programming results in Green Energy Storage

14:00-15:00

Green Energy solutions to current world energy problems involve intermittent energy technologies like wind or solar. As such, storage technologies are needed. Simple models of economic incentives that can be used to encourage energy storage are presented in the context of dynamic programming methods. This talk will be at an accessible level to quantitative finance specialists, actuaries, statisticians, and mathematicians.

Jose Maria Sarabia

University of Cantabria, Spain

Modelling Dependent Pareto Distributions with Applications in Risks Aggregation

15:30-16:30

The Pareto distribution has long been used as a suitable model for many non-negative economic variables, including losses and other variables in risk analysis. In this talk we review and study several proposals of multivariate dependent Pareto distributions, and we discuss some applications in risks aggregation. We begin reviewing several classes of multivariate distributions constructed using different methodologies and we propose some new classes. Then, we consider aggregated risks with multivariate dependent Pareto type II distributions. We study the individual and the collective risk models based on dependence. We consider some relevant collective models with Poisson and negative binomial as primary distributions. Finally, an application with real data is given.