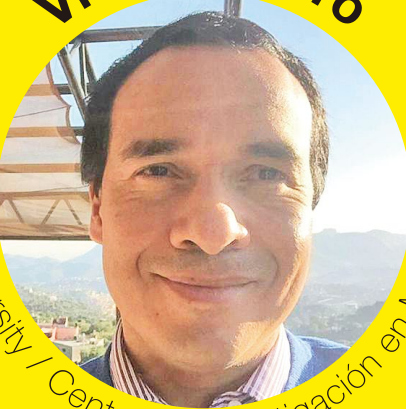**12/25 to 12/28 2018**

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Kyoto University / Centro de Investigación en Matemáticas

スーパーグローバルコース
数学特別講義 6

Fluctuation theory of Markov additive processes and self-similar Markov processes

Date: **Tuesday, December 25** to **Friday, December 28**

Time: **13:15-14:30 / 14:45-16:00** each day（8 lectures in total）

Venue: **127 Conference Room** Faculty of Science Bldg. #3 Kyoto University

By a self-similar process we mean a stochastic process having the scaling property. Self-similar processes often arise in various parts of probability theory as limit of re-scaled processes. Among several classes of self-similar processes, of particular interest to us is the class of *self-similar strong Markov processes* (ssMp).

The ssMp's are involved for instance in branching processes, Lévy processes, coalescent processes and fragmentation theory. Some particularly well-known examples are Brownian motion, Bessel processes, stable subordinators, stable processes, stable Lévy processes conditioned to stay positive, etc. Our main purpose in this course is to give a panorama of properties of ssMp's that have been obtained since the early sixties under the impulse of Lamperti's work, where the study of the case of positive valued ssMp's is initiated. The main result in Lamperti's work establishes that there is an explicit bijection between positive valued ssMp's and real valued Lévy processes. Recently it has been proved by Alili et al. that $\mathbb{R}^d$-valued ssMp's are in a bijection with a generalization of Lévy processes, namely *Markov Additive Processes* (MAP).

In this course we will mainly focus in the study of ssMp's making a systematic application of the fluctuation theory of Lévy processes and MAP's. So, we will start by giving a review of some key results in the fluctuation theory of Lévy processes and random walks, and then extending some of those results to MAP's. We will study some particular examples, most of them are ssMp's obtained as a path transformation of stable processes.

A detailed abstract is available at:
https://www.math.kyoto-u.ac.jp/~kyano/files/20181225rivero_ktgu.pdf

❖ 本講義は「スーパーグローバルコース数学特別講義 6」として、大学院の学生には1単位認定されます。

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