



Hong Kong Probability Seminar

<https://sites.google.com/site/hkprobability/>

Program

- **2:00-3:30pm: Tze Leung Lai (Stanford University)**

MCMC with Sequential State Substitutions: Theory and Applications

Abstract: Motivated by applications to adaptive filtering that involves joint parameter and state estimation in hidden Markov models, we describe a new approach to MCMC, which uses sequential state substitutions for its Metropolis-Hastings-type transitions. The basic idea is to approximate the target distribution by the empirical distribution of N representative atoms, chosen sequentially by an MCMC scheme so that the empirical distribution converges weakly to the target distribution as the number K of iterations approaches infinity. Making use of coupling arguments and bounds on the total variation norm of the difference between the target distribution and the empirical measure defined by the sample paths of the MCMC scheme, we develop its asymptotic theory. In particular, we establish the asymptotic normality (as both K and N become infinite) of the estimates of functionals of the target distribution using the new MCMC method, provide consistent estimates of their standard errors, and derive oracle properties that prove their asymptotic optimality. Implementation details and applications, particularly to adaptive particle filtering with consistent standard error estimate, are also given.

- **3:30-4:00pm: Coffee break**
- **4:00-5:30pm: Chung Yin Amy Pang (HKBU)**

Lumpings of algebraic Markov chains arise from subquotients

Abstract: A function on the state space of a Markov chain is a “lumping” if observing only the function values gives a Markov chain. I will describe some classical examples of lumping, for some card-shuffling models, then explain how these lumpings can be proved in a uniform way through the framework of “algebraic Markov chains”. This talk is based on Part I of the preprint of the same title.

Date: March 2, 2018 (Friday)
Time: 2:00 - 5:30pm
Venue: Room 210, Run Run Shaw Bldg., HKU

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Department of Mathematics, The University of Hong Kong.*