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Special Sessions - Probability

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Probability

Alejandra Rada (CMCC-UFABC, Brazil)

The Shortest Possible Return Time of β -Mixing Processes

Abstract: We consider a stochastic process and a given n -string. We study the shortest possible return time (or shortest return path) of the string over all the realizations of process starting from this string. For a β -mixing process having complete grammar, and for each size n of the strings, we approximate the distribution of this short return (properly re-scaled) by a non-degenerated distribution. Under mild conditions on the β coefficients, we prove the existence of the limit of this distribution to a non-degenerated distribution. We also prove that ergodicity is not enough to guaranty this convergence. Finally, we present a connection between the shortest return and the Shannon entropy, showing that maximum of the re-scaled variables grow as the matching function of Wyner and Ziv.

Élcio Lebensztayn (IMECC-UNICAMP, Brazil)

Phase transition for the frog model on trees

Abstract: The frog model is a stochastic epidemic model on a graph in which dormant particles begin to move and to infect other particles once they become infected. We study the frog model with geometric lifetimes on homogeneous and on biregular trees. With the help of branching processes, we obtain bounds for the critical parameter of the model.

Ludmila Rodrigues (IME-USP, Brasil)

Estimation of neuronal interaction graph from spike train data: method and application

Abstract: We address a basic question when analyzing experimental data in Neurobiology with respect to the the identification of the directed graph describing “synaptic coupling” between neurons. We present a novel estimator of effective connectivity, applying it to simulated and real data from a high quality multielectrode array recording dataset (Pouzat et al. 2015) from the first olfactory relay of the locust, *Schistocerca americana*. Our starting point is the procedure introduced in Duarte et al, 2016 and we present two novelties from the mathematical point of view: we propose a procedure allowing to deal with the small sample sizes met in actual datasets and we address the sensitive case of partially observed networks.