概率论系列报告

报告题目(Title)：Statistical Identification of Markov Chain

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时间(Time)：　5 月 9 日(周一)下午 3：00-4：00

地点(Venue)：　北京大学理科一号楼 1303

摘要(Abstract)：The study of Markov chains usually has an assumption with known density matrix. However the issue on the statistical identification of Markov chains is an inversion process to identify its unknown density matrix, which has very power realistic applications. The density matrix is identified by statistical and probabilistic method, based on the observation at the motion of the underlying Markov chain. Three types of Markov chains with condition on reversibility, stationarity (non-reversibility) and Markovian environment are discussed.

As example, the single ion channels with the underlying scheme can be kinetically modeled as (aggregated) homogeneous continuous-time Markov chain. A very important task is how to identify the transition rates of single ion channels by a small number of states (i.e. identify the Q-matrix of the underlying Markov chain). A Markov chain inversion approach (MCIA) is developed to perform a difficult inversion to identify the transition rates from the parameters characterizing the lifetime (sojourn time and hitting time) distributions at a small number of states, although it is straightforward to derive the lifetime distribution. The general explicit constraints relating the parameters of the life-time distribution to the transition rates are derived. The transition rates can be obtained with a computer program.

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