Abstract

Industrial and chemical mixing processes of various kinds occur throughout nature and are vital i many technological applications. In the context of discrete dynamical systems, the transfer operator approach has been shown as a powerful tools from both theoretic and numerical view point. In this talk, I will use a toy model (i.e., the one dimensional stretch and fold map) as an example to provide a brief introduction on the relationships between the spectral properties of the associated transfer operator and the estimations of the optimal mixing rate of the mixing process. Moreover, I will address how the optimal mixing rate varies according to the stretch and fold map has "cutting and shuffling" behaviour (i.e., composing with a permutation). If time permits, I will also talk about how to interpret this problem to the eigenvalue estimations for the Random bi-stochastic matrices (free probability theory) and the locations of poles of the dynamical zeta function. This is a joint work with Charles Bordenave and Yanqi Qiu.