國立交通大學應用數學系
學術演講公告

主講人：Dr. Yuki Chino (NCTS)

講　題：A crossover for Random Walk in Cooling Random Environment

時　間：109 年 3 月 31 日(星期二) 下午 14:00 –15:00

地　點：(光復校區) 科學一館 223 室

茶　會：當天下午 13:30 (科學一館 205 室)

Abstract

Random Walk in Random Environment (RWRE) was introduced by biophysicists Chernov and Temkin to understand the mechanism of DNA replication. In mathematical literature, Solomon first considered the model in his thesis and obtained some results for the criterion between recurrence and transience and the law of large numbers. One-dimensional Random Walk in Cooling Random Environment (RWCRE) is obtained as a patchwork of one-dimensional RWRE by resampling the environment along a sequence of deterministic times. The RWCRE model can be seen as a model that interpolates between the classical static model and the model with i.i.d. sampling every unit of time. The latter model is called Random Walk in Dynamic Random Environment (RWDRE), which shows some localization or homogenization, depending on the choice of the dynamics. In the RWCRE model, we can tune the dynamics to control its asymptotic behavior.

In this talk, we have some results about the asymptotic behavior of RWCRE. We investigate how the recurrence versus transience criterion known for RWRE changes for RWCRE. We also explore the fluctuation for RWCRE when RWRE is either recurrent or satisfies a classical central limit theorem (CLT). We also show that the strong law of large numbers (SLLN) and the large deviation principle (LDP) for RWCRE are the same as those for RWRE under a certain condition for the resampling, which means some form of localization. However, the first two results (criterion and fluctuations) are different from those for RWRE. We can see a crossover of the limit distribution in the recurrent regime, i.e., between so-called Sinai-Kesten distribution, which is a typical one of RWRE, and Gaussian distribution, which is typical for homogeneous RW. This implies a crossover between localization and homogenization.

This talk is based on a joint work with L. Avena (Leiden University), C. da Costa (Durham University) and F. den Hollander (Leiden University)..

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