國立中山大學應用數學系
學術演講

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講　題：Mathematical Models of Opinion Dynamics

時　間：2021/11/25（Thursday）14:10 ~ 15:00

地　點：理 SC4009-1 教室

茶　會：13:30

Abstract

This talk consists of two papers about opinion dynamics. The first paper is in collaboration with Prof. Lanchier while the second paper is an individual work. Two models are introduced and studied analytically: the Deffuant model and the Hegselmann-Krause (HK) model. The main difference between the two models is that the Deffuant dynamics consists of pairwise interactions whereas the HK dynamics consists of group interactions. Translated into graph, each vertex stands for an agent in both models.

In the Deffuant model, two graphs are combined: the social graph and the opinion graph. The social graph is assumed to be a general finite connected graph where each edge is interpreted as a social link, such as a friendship relationship, between two agents. At each time step, two social neighbors are randomly selected and interact if and only if their opinion distance does not exceed some confidence threshold, which results in the neighbors' opinions getting closer to each other. The main result about the Deffuant model is the derivation of a positive lower bound for the probability of consensus that is independent of the size and topology of the social graph but depends on the confidence threshold, the choice of the opinion space and the initial distribution.

For the HK model, agent i updates its opinion xi by taking the average opinion of its neighbors, defined as the set of agents with opinion at most ϵ apart from xi. Here, $\epsilon > 0$ is a confidence threshold. There are two types of HK models: the synchronous and the asynchronous HK models. In the former, all the agents update their opinion simultaneously at each time step, whereas in the latter, only one agent is selected uniformly at random to update its opinion at each time step. The mixed model is a variant of the HK model in which each agent can choose its degree of stubbornness and mix its opinion with the average opinion of its neighbors. The main results about the mixed model show conditions under which the asymptotic stability holds or a consensus can be achieved.

敬 請 公 告！ 歡 迎 參 加！

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