

國立陽明交通大學應用數學系

學術演講公告

主講人：張俊偉 博士（國家理論科學研究中心）

講 題：Reconstructing large interaction networks from empirical time series data

時 間：110 年 10 月 26 日(星期二) 下午 14:00 –15:00

地 點：(光復校區) 科學一館 223 室

Abstract

Reconstructing interactions from observational data is a critical need for investigating natural biological networks, wherein network dimensionality is usually high. However, these pose a challenge to existing methods that can quantify only small interaction networks. Here, we proposed a novel approach to reconstruct high-dimensional interaction Jacobian networks using empirical time series without specific model assumptions. This method, named “multiview distance regularized S-map”, generalized the state space reconstruction to accommodate high dimensionality and overcome difficulties in quantifying massive interactions with limited data. When evaluating this method using time series generated from theoretical models involving hundreds of interacting species, estimated strengths of interaction Jacobians were in good agreement with theoretical expectations. Applying this method to a natural bacterial community helped identify important species from the interaction network and revealed mechanisms governing the dynamical stability of a bacterial community. The proposed method overcame the challenge of high dimensionality in large natural dynamical systems.

敬請公告 歡迎參加

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