



Computational Science Seminar

Discovery mathematical models from experimental data

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Abstract

In this talk, we will present two recent techniques to discover mathematical models from data using machine learning techniques. In the first part of the talk, we advocate the use of Dynamic Mode Decomposition (DMD), an equation-free method, to approximate the data with a linear model. DMD is a spatio-temporal matrix decomposition of a data matrix that correlates spatial features while simultaneously associating the activity with periodic temporal behavior. With this decomposition, one can obtain a reduced dimensional surrogate model and use for future state predictions or extrapolate missing information from the data. In the second part, we address the problem of discovering nonlinear ODEs and PDEs from data. We will show that we can recover the mathematical problem by means of sparse optimization methods such as LASSO and RIDGE regression. Examples and applications of the methods will be showed during the talk.

Date:	January 29, 2019 (Tuesday)
Time:	4:00 - 5:00pm
Venue:	Room 210, Run Run Shaw Bldg., HKU