

課程大綱內容:

This will be a special topics course that focusing on recent work that involves modeling metabolic, signaling, and gene regulation networks in cells, with a particular focus on using machine learning methods to analysis, synthesis, design and control the models from data. Qualitative and quantitative mathematical models that accurately predict physical phenomena are essential in many fields of engineering and science. This course will cover following topics:

1. Graphical representation of biochemical systems;
2. Models of biochemical systems;
3. From maps to equations;
4. Computer simulation;
5. Parameter estimation;
6. Analytical steady-state evaluation;
7. Sensitivity analysis;
8. Case study: S-System

Textbooks:

1. Modeling Biological Systems: Principles and Applications. James W. Haefner. (1996)
2. Computational Analysis of Biochemical Systems A Practical Guide for Biochemists and Molecular Biologists. Eberhard O. Voit. (2000)

References:

1. Model Selection and Inference: Apractical Information-Theoretic Approach. Kenneth P. Burnham, David R. Anderson. (1998)
2. Investigating Biological Systems Using Modeling: Strategies and Software. Meryl Wastney, Blossom Patterson, Oscar Linares, Peter Greif, Raymond Boston. (1999)