MIMS/CMMA

Meiji University
Center for Mathematical Modeling and Applications

MIMS Lecture Series

Biochemical reaction networks

生化学ネットワーク反応

Bernold Fiedler

Institute of Mathematics Free University of Berlin

2015, May 18th 14:40- 17:50

明治大学中野キャンパス６階　研究セミナー室６０３

Abstract

1 : 14:40-16:10

Sensitivity of equilibrium response

For monomolecular chemical or biological reaction networks, we describe the steady state response to perturbations of reaction rates. Our function-free approach does not require numerical input, but is based on the directed graph structure of the monomolecular reaction network, only. Our results and concepts are motivated by specific metabolic networks like the tricarboxylic citric acid cycle.

2 : 16:20-17:50

Dynamics of regulatory networks

We show that the concepts of informative nodes (Mochizuki) and determining nodes (Foias, Temam) coincide with the notion of feedback vertex sets from graph theory. As a result we can determine, and control, the long-time dynamics of entire networks from observations on a feedback vertex set, only. Examples include early Ascidian embryogenesis and genetic circadian clocks in mammals.

Both talks are joint work with Atsushi Mochizuki (RIKEN Tokyo). He will kindly give an introduction to the biological background, for each talk.

See also http://dynamics.mi.fu-berlin.de/

主催：
文部科学省　共同利用・共同研究拠点
明治大学先端数理科学インスティテュート
現象数理学研究拠点（CMMA）

問い合わせ先：
〒164-8525
東京都中野区中野4－21－1 明治大学中野キャンパス８階
明治大学先端数理科学インスティテュート
Tel. 03-5343-8067　E-mail：mims@mics.meiji.ac.jp

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