Hamilton Institute

Control and System Theory for Biochemical Reaction Networks

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Abstract

The aim of the research described here is to understand how a living cell functions and use this understanding in order to form a basis for rational drug and process design in the pharmaceutical and bio-tech industries. To this end the seminar will describe how biochemical reaction networks can be modelled as a positive control system and their dynamical and system theoretic properties described. The problem of rational drug design will then be formulated as a control problem and an approach will be discussed and illustrated for glycolysis in Trypanosoma brucei.

The problem of system reduction is motivated by the very large size of dynamic systems obtained for realistic modelling of biochemical reaction networks in a cell. First results and the approach to the research project for system reduction will be presented including the example of glycolysis in yeast. System identification is another problem of biochemical reaction networks which requires attention and suggestions for an approach using observer theory for positive systems will be presented.

The research described in this talk is a co-operation with biologists of the Vrije Universiteit (Hans Westerhoff, Barbara Bakker, Frank Bruggeman, etc.).

Venue: Seminar Room, Hamilton Institute,
Rye Hall, NUI Maynooth

Time: 2.00 - 3.00pm (followed by tea/coffee)

Travel directions are available at www.hamilton.ie

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