

PhD research topic proposal
BME, Doctoral School of Mathematics and Computer Science

Name and degree of supervisor :

János Tóth, Ph.D.

Are you willing to supervise Stipendium Hungaricum applicants?

Yes

Title of the topic:

Mathematical problems of formal reaction kinetics

Short description:

The central problem of formal reaction kinetics is to follow the time evolution of concentrations in a chemical reaction. The most often used tool is the theory of differential equations, however—in spite of the nonlinearity of the equations—linear algebra has an important role. The structure of reactions is characterized by different graphs, the structural properties of these graphs are in strong connection with the qualitative properties of the solutions of the corresponding differential equation. Among the methods of investigation symbolic programming is very important beyond usual numeric methods. As opposed to the deterministic approach, stochastic models may also be relevant, especially in cases when the number of particles is small. The stochastic models are interesting in themselves, and in their relationship to the deterministic approach.

Requirements: Differential equations, linear algebra, elements of graph theory; experience in programming (Wolfram Language preferred), interest in chemical or biological applications.

Contact:

E-mail:

jtoth@math.bme.hu

Place of work:

Department of Analysis, Budapest Univ. Technol. Econ. Budapest, Egry J. u. 1. Building H