Geometry and dynamics of reaction systems

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Thursday, January 24, 2013
007 Kemeny Hall, 4:00PM
Tea 3:30PM 300 Kemeny Hall

Abstract

Chemical reaction networks are directed graphs in which each edge represents a chemical reaction. The most basic kinetics to assign to reaction networks are those of mass-action, first introduced nearly 150 years ago by Guldberg and Waage: the rate at which each reaction occurs is proportional to the product of the concentrations of its reactants. The systematic study of the resulting polynomial ordinary differential equations began in the 1970s, and in recent years, this area has seen renewed interest, due in part to applications to systems biology. This talk will survey progress on long-standing questions pertaining to the dynamics of reaction systems, particularly their multistationarity and long-term stability, using methods from combinatorics and polyhedral as well as toric geometry.

This talk should be accessible to graduate students.