Abstract

This project involves the study of current fluctuations in the asymmetric simple exclusion process for a variety of initial configurations. This is a model of interacting particles on a one-dimensional lattice. The model has attracted wide attention from both mathematicians and physicists since it is one of the simplest models to incorporate far from equilibrium behavior with nonclassical fluctuations. These fluctuations are expected to have a new universal behavior similar in their applicability to the famous bell-shaped curve (the Gaussian distribution) of classical probability. A long-term goal of research in this area is the establishment of new limit laws similar in nature to the classical central limit theorem. Already these new universal distributions are being applied to various problems in growth processes, population genetics, and finance. This project will extend our knowledge of fluctuations to a much wider class of growth models.