

School of Mathematics & Statistics
Applied Mathematics Colloquium

Parameter estimation for pedestrian dynamics models

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14:00
Room 306 Alan Turing

Abstract:

In this talk we present a framework for estimating parameters in macroscopic models for crowd dynamics using data from individual trajectories. We consider a model for the unidirectional flow of pedestrians in a corridor which consists of a coupling between a density dependent stochastic differential equation and a nonlinear partial differential equation for the density. In the stochastic differential equation for the trajectories, the velocity of a pedestrian decreases with the density according to the fundamental diagram. Although there is a general agreement on the basic shape of this dependence, its parametrization depends strongly on the measurement and averaging techniques used as well as the experimental setup considered. We will discuss identifiability of the parameters appearing in the fundamental diagram, introduce optimisation and Bayesian methods to perform the identification, and analyse the performance of the proposed methodology in various realistic situations. Finally, we discuss possible generalisations, including the effect of the form of the fundamental diagram and the use of experimental data.

Tea and coffee will be available in the common area from 15:00