SOE 21: Traffic Dynamics, Urban and Regional Systems

Time: Friday 10:15–11:00 Location: GÖR 226

SOE 21.1 Fri 10:15 GÖR 226

On vehicular traffic data analysis — •Martins Brics and Reinhard Mahnke — Institute of Physics, Rostock University, Germany

This contribution consists of analysis of empirical vehicular traffic flow data. The main focus lies on the Next Generation Simulation (NGSIM) data. The first findings show that there are artificial structures within the data due to errors of monitoring as well as smoothing position measurement data. As a result speed data show discretisation in 5 feet per second.

The aim of this investigation is to construct microscopic traffic flow models which are in agreement to the analysed empirical data.

The ongoing work follows the subject of research summarized by Christof Liebe in his PhD thesis entitled "Physics of traffic flow: Empirical data and dynamical models" (Rostock, 2010), see `http://rosdok.uni-rostock.de`.

SOE 21.2 Fri 10:30 GÖR 226

Game theoretic modelling of evacuation dynamics — •Michalis Smyrnakis and Tobias Galla — Complex Systems Group, School of Physics & Astronomy, The University of Manchester, Manchester M13 9PL, UK

We model and simulate the dynamics of crowd evacuation in a game theoretic setting, based on extensions of the Helbing-Farkas-Vicsek model. In particular we consider situations in which agents evacuate rooms, bridges or corridors with several exits. Each agent then needs to make a decision on which exit route to choose, trying to optimise their own 'payoff', i.e. their chances of safe escape. Overall crowding and limitations in the geometry lead to potentially competitive strategic interaction between individual evacuees. Agents make their decisions based on information available to them (e.g. local degree of crowding, distance from the different potential exits, local direction of flow) and within the physical constraints imposed on them by other agents. The available information may change over time, and agents may revise their decisions as the evacuation progresses, using a myopic adaptation rule. We will also examine the impact of communication between pedestrians and how the number of agents with access to communication devices (e.g. mobile phones) can influence the total evacuation time.

SOE 21.3 Fri 10:45 GÖR 226

Optimization of occupation numbers of trains by financial measures of risk — Uli Spreitzer[1], Vladimir Reznik[2], and •Robert Löw[3] — [1]Bonus Pensionskassen AG, Traungasse 14-16, 1030 Vienna, Austria — [2]Towers Watson Deutschland GmbH, Abraham-Lincoln-Str. 22, 65189 Wiesbaden, Germany — [3]Continental, Siemensstrasse 12, 93055 Regensburg, Germany

Occupation numbers of trains or busses are calculated with a model of finite amount of train stations. We apply a random amount of persons entering or leaving a train at each station. Assuming distributions and volatility models used within financal mathematics we show a dependency between train occupation number, number of train stations and distribution of transfer passengers at train stations. We apply an process for optimization of the occupation number, as used in financal mathematics. The optimization is achieved by variation of a few parameters: the number of train stations, the homogenity of passenger transfers at train stations and the relation of train capacity to amount of transfer passengers.