

AKSOE 6 Traffic Dynamics, Urban and Regional Systems II

Zeit: Samstag 14:00–16:00

Raum: TU P-N203

AKSOE 6.1 Sa 14:00 TU P-N203

Spontaneous formation and decay of platoons in continuous microscopic traffic models — ●MARTIN TREIBER, ARNE KESTING und DIRK HELBING — Institute for Transport & Economics, Dresden University of Technology

We investigate adaptations of the time gap of car-following models as a function of the smoothness of traffic flow measured by the local velocity variance. We simulate open systems with an on-ramp as bottleneck and analyze one-minute data and single-vehicle data generated by several "virtual detectors".

Both the widely scattered and hysteretic fundamental diagram and microscopic results such as the distributions of the netto time headways derived from these "virtual" data indicate that spontaneous formation and decays of platoons take place. Moreover, there is a nearly quantitative agreement with actual traffic data.

We explain these results by a self-organized process driven by the adaptations of the time headway that leads to spontaneous emergences and decays of platoons even for deterministic dynamics of identical vehicles on a single lane.

AKSOE 6.2 Sa 14:30 TU P-N203

Information Propagation in an Ad-hoc Car2Car Network — ●ARNE KESTING, MARTIN SCHÖNHOF, MARTIN TREIBER, and DIRK HELBING — Institute for Transport & Economics, Dresden University of Technology

Traditional sensors of Adaptive-Cruise Control Systems only detect the immediate vehicle environment. To extend these limitations information transport on freeways based on car-to-car communication is a possible scenario for a next generation of Driver-Assistance Systems.

Therefore, we consider an ad-hoc radio network formed by equipped vehicles with a limited range for broadcasting messages to each other. By using equipped cars as relays messages about the actual traffic situation are transported further upstream in a self-organized manner without a central traffic management station on a short timescale.

For small percentages of equipped cars the message hopping within one driving direction is obviously rather limited. We propose to use the vehicles in the other driving direction as relays, too. Analytic results based on a Poisson approximation show the efficiency and velocity of information propagation by means of transverse message hopping. The propability distributions are compared to numerical results of microscopic traffic simulations.

AKSOE 6.3 Sa 15:00 TU P-N203

Towards a Traffic Telematics Testbed at TUB — ●GUNNAR FLÖTTERÖD and KAI NAGEL — Transport Systems Planning and Transport Telematics Group, Sekr. SG 12, Salzufer 17-19, D-10587 Berlin

We present a microsimulation based traffic telematics testbed for integrative evaluation of telematics devices and strategies. As a synthetic reality, we apply the SUMO traffic simulator which microscopically represents traffic dynamics, driver's long ranging route choice and spontaneous en route replanning; we also prepare to extend SUMO by a module for activity based demand generation. On the traffic telematics side, we currently focus on two aspects: Traffic Monitoring/Prediction and Traffic Control. The former is based on a macroscopic model which we adjust by means of mathematical programming and evaluate by feeding it with synthetic measurements from our SUMO testbed. The latter serves as an extension to SUMO itself and allows for the evaluation of different (mainly agent based) control strategies. To keep the entire system expandable, we systematically integrate all aforementioned subsystems into a general traffic telematics control loop, strongly focussing on real world applications and effortless expandability.

AKSOE 6.4 Sa 15:30 TU P-N203

Bologna Revisited — ●RAINER E. ZIMMERMANN — a,b

The following paper is on the emergence of observable complexity in urban networks visualized as product of essentially non-observable social processes. The methodology unfolded here draws on recent insight of econophysics in the strict sense under a top-down perspective of laying the foundations for a modern view to the evolution of dynamical structures in nature. The basic result of the present paper is to demonstrate the interaction of networks on the microlevels and macrolevels of

the historical centre of the city of Bologna visualized as an emergent computational urban system, respectively.