DY 77: Talk S. Herminghaus

Time: Friday 9:30–10:00 Location: BH-N 243

Invited Talk DY 77.1 Fri 9:30 BH-N 243

Mean field theory of ride sharing systems — •Stephan Herminghaus — MPI für Dynamik und Selbstorganisation, Am Fassberg 17, 37077 Göttingen

The dynamics of demand-driven ride sharing systems is considered in a mean-field approach. The relevant dimensionless quantities determining the performance and viability of such systems are identified. The framework for a class of route assignment algorithms is developed. In the presence of an already established dominant market participant with comparable service quality (like, e.g., the private car), the mutual interaction of the actors (i.e., the customers sharing rides) by virtue of the route assignment algorithm gives rise to a discontinuous transition between two strongly different modes of operation. One of them represents the typical (unfavorable) performance of current ride sharing systems, while the other represents a new mode of operation in which virtually all customers use ride sharing. We furthermore consider the impact of the spatial structure of the traffic environment. It is shown how the Riemann curvature of the traffic network can be determined in a simple way inspired by the Regge calculus, and how it can be implemented in the route optimization scheme.