

ON THE ERGODICITY OF A MICROSCOPIC TRAFFIC MODEL FOR A ROAD NETWORK

Abstract

Vehicular traffic is analyzed in computer simulations. Often, microscopic traffic models, i.e. models in which every vehicle is modeled on its own, are used. The high-dimensional microscopic states are transformed into macroscopic values by taking the mean of some interesting values, like the traffic flow, the traffic density, or the fundamental diagram. The question is, whether such an approach delivers reliable results. Necessary for this is the existence of a Law of Large Numbers.

We will prove an ergodic theorem for a prototypical traffic model with general state space, based on a model introduced by Poppinga. From this ergodic theorem some LLNs will be derived. Finally we will give possible extensions of the model and discuss how the proof might be extended to such models.