

TEMPLE UNIVERSITY
Department of Mathematics

Applied Mathematics and Scientific Computing Seminar

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Two-Dimensional Macroscopic Models for Large-Scale Traffic Networks

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Abstract.

Macroscopic traffic models aim to describe traffic flows with aggregated quantities such that the density of vehicles, their flow, their speed. These kinds of model based on Partial Differential Equation (PDE) are well known to describe traffic on a single road as for instances the Lighthill-Whitham-Richards (LWR) model. In this talk, we investigate how to extend these models to a homogeneous road network by considering a two dimensional macroscopic model. Then, we show an extension to the case of heterogeneous network by considering space-dependant parameters. We suggest a method to compare the results of simulation with microsimulation. Finally, we extend the model to a multilayer model where each layer of density describes a different direction of traffic. However, the resulting PDE is not anymore hyperbolic as typically are the 1-D PDE (i.e. the LWR model), but results into a hybrid hyperbolic-elliptic PDE depending on the density level.