

The BGK approximation of kinetic models for traffic

Michael Herty ^{*}, Gabriella Puppo [†], Giuseppe Visconti [‡]

We study spatially non-homogeneous kinetic models for vehicular traffic flow. Classical formulations, as for instance the BGK equation, lead to unconditionally unstable solutions in the congested regime of traffic. We address this issue by deriving a modified formulation of the BGK-type equation. The new kinetic model allows to reproduce conditionally stable non-equilibrium phenomena in traffic flow. In particular, stop and go waves appear as bounded backward propagating signals occurring in bounded regimes of the density where the model is unstable. The BGK-type model introduced here also offers the mesoscopic description between the microscopic follow-the-leader model and the macroscopic Aw-Rascle and Zhang model.

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References

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^{*}IGPM, RWTH Aachen University, Aachen, Germany. Email: herty@igpm.rwth-aachen.de

[†]Department of Mathematics, Sapienza University, Rome, Italy. Email: gabriella.puppo@uniroma1.it

[‡]Department of Mathematics, Sapienza University, Rome, Italy. Email: giuseppe.visconti@uniroma1.it