

Homogenization of a discrete model for a bifurcation and application to traffic flow

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Introduction

The present work focuses on obtaining a macroscopic model from a microscopic model for traffic flow in the case of a simple bifurcation. In order to obtain this result we will proceed as in [1, 2, 3, 4] and rescale the microscopic model which describes the dynamics of each vehicle, in order to obtain a macroscopic model that describes the dynamics of the density of vehicles. Like in [4], we will consider the bifurcation like a local perturbation located around the origin (see Figure 1) and we want to understand how this bifurcation affects the density of vehicles at a macroscopic scale. At the macroscopic scale we will obtain a Hamilton-Jacobi equation on each branch and a junction condition at the origin.

In this work we will use the recent developments on Hamilton-Jacobi equations on networks, particularly the paper of Imbert and Monneau [5] which gives a suitable definition of viscosity solutions at the junction.

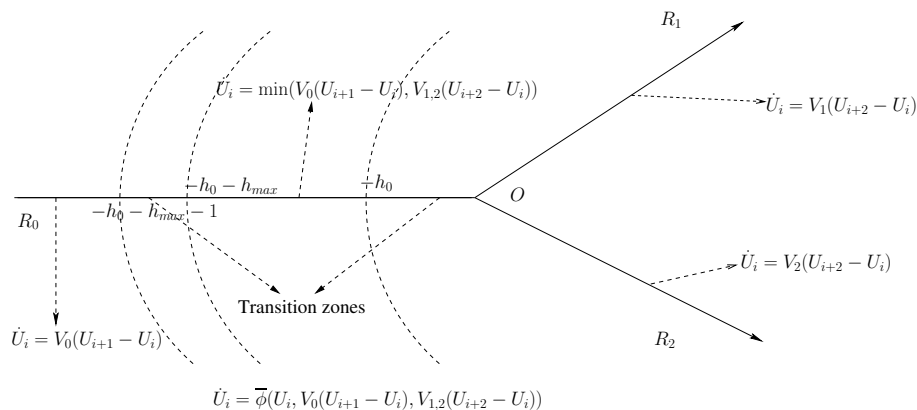


Figure 1: Schematic representation of the microscopic model.

References

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