

TRAFFIC CIRCLES AND TIMING OF TRAFFIC LIGHTS FOR CARS FLOW

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ABSTRACT. In this paper we address the following traffic regulation problem: given a junction with some incoming roads and some outgoing ones, is it preferable to regulate the flux via a traffic light or via a traffic circle on which the incoming traffic enters continuously? More precisely, assuming that drivers distribute on outgoing roads according to some known coefficients, our aim is to understand which solution performs better from the point of view of total amount of cars going through the junction.

To deal with this problem we consider a fluid dynamic model for traffic flow on a road network. The model is that proposed in [9] and is applied to the case of crossings with lights and with circles. For the first we consider timing of lights as control and determine the asymptotic fluxes. For the second we extend and complete the model of [9] introducing some right of way parameters. Also in this case we determine the asymptotic behavior.

We then compare the performances of the two solutions. Finally, we can indicate which choice is preferable, depending on traffic level and control necessity, and give indications on how to tune traffic light timing and traffic circle right of way parameters.

1. Introduction. We consider the following traffic regulation problem: when constructing a junction with some traffic flux expected is it preferable a traffic light or a circle? More precisely, we assume that drivers arriving at the junction distribute on the outgoing roads according to some known coefficients and our aim is to understand which solution performs better from the point of view of total amount of cars going through the junction.

To deal with this problem we need a model that describes the above situation and permits an accurate analysis. Thus we consider the fluid dynamic model on a road network proposed in [9] and extend it to treat the case of traffic circle. Let us first explain such approach.

Fluid dynamic models for traffic flow seem the more appropriate to detect some phenomena as shocks formation and propagation on roads. Recently in [9, 12, 13] some models were proposed also for traffic flow on road networks. On each single

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