MODELING AND CONTROL OF URBAN TRAFFIC, IN THE MACROSCOPIC REPRESENTATION

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Rezumat. *Lucrarea propune o metodologie pentru modelarea traficului rutier, organizată pe două direcţii: o abordare descentralizată, în care structura de trafic este descompusă în elemente componente de bază, modelate cu ajutorul teoriei mecanicii fluidelor şi o abordare centralizată, în care reţeaua rutieră este văzută ca o reţea compartimentală, modelată pe baza teoriei sistemelor pozitive. În primul caz, controlul este asigurat prin algoritmi polinomiali numerici de tip RST, calculaţi pentru a asigura performanţele dorite pentru sistemul în buclă închisă. În cel de-al doilea caz, regulatorul este el însuşi o reţea compartimentală, care are rolul de a pondera fluxurile de intrare pentru a evita congestionarea reţelei.*

Abstract. *A methodology for modeling road traffic is proposed, organized in two directions: a decentralized approach, in which the traffic structure is decomposed into basic elements, modeled using the theory of fluid mechanics, and a centralized approach, where the road network is seen as compartmental network, modeled on the theory of positive systems. In the first case the control is ensured by numerical algorithms of RST type, calculated to provide the desired performance for the closed loop system. In the second case, the controller is itself a compartmental network that has the role of weighting inflows to avoid network congestion.*

Keywords: road traffic, macroscopic model, modeling and simulation, numerical control

1. Introduction

In the last decades different concerns related to road transport have been challenging specialists. The main topics are focused on resolving the shortcomings related to increased comfort and safety in traffic, environmental pollution and fuel quality and consumption.

Effective management and modernization of traffic relies on modeling and controlling the flow of vehicles in circulation, the increasing interest in equipping vehicles and transport infrastructure with electronic devices and computer components that make possible the prospect of intelligent traffic circulation.

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