

Title: Variable Speed Limit Control on Urban Motorways

Abstract: To optimally use the existing road infrastructure today various road traffic control systems from the domain of Intelligent Transport Systems (ITS) are applied. This ITS service enables increase of the road network throughput and decrease of vehicle emissions. Special category of roads are urban motorways, and on them ramp metering and variable speed limit control (VSLC) are applied. Both traffic control systems rely on measuring the current traffic state to react upon the traffic process in order to prevent or reduce the effects of congestion. In this lecture, the concept and motivation of VSLC is explained, and two reactive control laws for VSLC are analysed using a simulation framework based on Matlab and the simulators VISSIM and EnViVeR. Presented analysis contains comparison of simulation results related to traffic parameters and vehicle emissions. The developed simulation framework contains a real-time closed control loop consisted of the following parts: (i) collection of measurement data from traffic detectors; (ii) estimation of traffic parameters; (iii) computation of new speed limit values; (iv) collection of relevant simulation data; and (v) communication between Matlab and VISSIM. It can be easily adapted for the simulation of urban networks containing control of signalized intersections, which is explained in the future work section briefly.

Short CV: Edouard Ivanjko is an Assistant Professor at the Department of intelligent transport systems on the Faculty of Transport and Traffic Sciences University of Zagreb. His research interests are related to ITS, modelling and simulation of road traffic, road traffic control systems based on learning, forecast of road traffic parameters, autonomous vehicles and the application of computer vision in road traffic. He participated as a senior researcher on various national and international projects like: IPA project Computer Vision Innovations for Safe Traffic (VISTA), FP7 project Intelligent Cooperative Sensing for improved traffic Efficiency (ICSI), MZOS project Development Methodology of Integrated Adaptive Transport-logistic Systems, COST action TU1102 Towards Autonomic Road Transport Support Systems (ARTS), and EU structural fund project System for route optimization in a dynamic transport environment (SORDITO). Currently he is participating in the COST action IC1406 High-Performance Modelling and Simulation for Big Data Applications (cHiPSet), and in the ACROSS - Data Science: Croatian Centre of Research Excellence for Data Science and Advanced Cooperative Systems. He is a member of ITS Croatia, IEEE, and KOREMA.