

Feedback-Based Integrated Motorway Traffic Flow Control

Ioannis Papamichail

School of Production Engineering and Management,
Technical University of Crete,
731 00 Chania, Greece.
ipapa@dssl.tuc.gr

Abstract

Congestion on motorways is a serious problem of modern societies. It reduces the nominal capacity of the motorway infrastructure, with serious impact on travel times, traffic safety, fuel consumption and environmental pollution. Various traffic management measures have been proposed to alleviate traffic congestion but are known to face limitations. An integrated motorway traffic flow control concept is proposed in this presentation. It is based on the extension of an existing cascade feedback controller for mainstream traffic flow control with multiple bottlenecks. The new integrated controller remains simple yet efficient and suitable for field implementation. It enables the integration of ramp metering and variable speed limit actions, balancing the delays caused by the different actuators. The controller is evaluated using a validated macroscopic model.