IVT - Seminar

"Speed or spacing? Cumulative variables, and convolution of model errors and time in traffic flow models validation and calibration"

by Prof. Vincenzo Punzo

Friday, June 17th, 2016, 11:00-12:00 hr
HIL H35.1; ETH Hönggerberg, Zürich

Abstract:
Keeping memory of model residuals occurrence times is essential in traffic flow modelling where the ability of reproducing the dynamics of a phenomenon – as a bottleneck evolution or a vehicle deceleration profile – may count as much as the ability of reproducing its order of magnitude. Unfortunately, global error statistics usually applied to measure the discrepancy between a simulation and the real world (see e.g. the RMSE or the MAE) have not this property. In this talk it is shown that such limitation can be overcome by applying a convolution of model residuals and time. Actually, such transformation is implicitly obtained if a variable is replaced by its cumulative sum in the calculation of a global error statistic. It results that in car-following models, validation and calibration on travelled space/gap is more robust than calibration on speed or acceleration. Similarly, in case of macroscopic traffic flow models, densities are to be preferred to flows for calibration and validation.

Presenter's bio:
Vincenzo Punzo is Associate Professor with the Department of Civil, Building and Environmental Engineering of the University of Naples Federico II. He received his M.Sc. in Civil Engineering and his Ph.D. in Transportation Engineering from the same University in 1998 and 2002 respectively, where he was Assistant Professor from 2005 to 2011. From 2011 to 2013 he was Senior Researcher at the European Commission Joint Research Centre, Ispra, Italy. Dr. Punzo's research interests include traffic flow modelling and control under uncertainty, railway simulation and optimization, intelligent transportation systems (ITS), driving simulation and road safety. He recently chaired the EU COST Action TU0903 - MULTITUDE on the topic of the management of uncertainty in traffic simulation and is an editorial board member of Transportation Research C and of the International Journal of Transportation, and a Member of the TRB's Traffic Flow Theory and Characteristics Committee (AHB45). Among others, he was recipient of the 2012 TRB's Greenshields Prize.

Organizer: Dr. Monica Menendez (monica.menendez@ivt.baug.ethz.ch)
No reservation is required.

IVT Institut für Verkehrsplanung und Transportsysteme
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