



WSPS 2

**Informatikus és Matematikus
PhD hallgatók második téli iskolája**

**Doktoranduszok Országos Szövetsége
Matematikai és Informatikai Tudományok Osztálya**

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PhD hallgatók második téli iskolája**

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Informatics and Mathematics

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SYSTEM OPTIMUM AND USER EQUILIBRIUM OF A TRAFFIC SYSTEM

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We developed a stand-alone, PC based micro-simulator that is based on published lane-changing and car-following models, such as the Intelligent Driver Model (IDM) or the Wiedemann model. The simulator is capable for studying arbitrary traffic networks up to the size of a city; and being open-source module-based software, it is easy to change the underlying mathematical models or extend the simulator with new elements. The IDM based version of our simulator was validated with the help of measurement data of Hungarian traffic intersections and those of other international publications. So far the IDM were applied and validated for highway situations, however we determined the parameters of the IDM for an urban environment where the traffic flow is controlled mainly by traffic lamps. As a result it was obtained that the IDM parameters in an urban situation differ definitely from those of a highway situation.

In a parallel project we applied a linear optimization solver in order to determine the so called System Optimum of a traffic system with given boundary conditions. In the other hand the so called User Equilibrium state of the same system was also determined by the micro-simulator above. It was found that in the System Optimum state the optimization parameter (the total emission in this case) is better than that in the User Equilibrium state.