MAGnUM: A Multiscale and Multimodal Traffic Modelling Approach for Sustainable Management of Urban Mobility

Ludovic Leclercq

Univ. Lyon, IFSTTAR, ENTPE

December, 12th, 2018
The motivations

Efficient transportation system

User optimum \rightarrow System optimum

Flows (network) \rightarrow Trips (users)

Urban mobility & sustainability

Smart and complex cities

iMobility

Daily (dynamic) management

© photo credits – Fotolia.com
Complexity of urban mobility dynamics

A complex system with non-linear interactions and significant feedbacks

User feedbacks

System feedbacks

Traffic control and regulation

User adaptations

Congestion appearance

Limits to predictability at large scale

Congestion spreading

Scaling up
A better understanding of collective behaviors

Route choices investigations
A better characterization of congestion patterns

©Google Maps - 2018

3D congestion maps
A new generation of dynamic traffic models
Investigating new (and greener) traffic control

Network-wide emission control

Gating with global objective functions

<table>
<thead>
<tr>
<th>Control Strategy</th>
<th>Total travel Time</th>
<th>CO2</th>
<th>NOx</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic inside the perimeter</td>
<td>-13%</td>
<td>-5%</td>
<td>-9%</td>
</tr>
<tr>
<td>Total Emission</td>
<td>+15%</td>
<td>+22.5%</td>
<td>+16%</td>
</tr>
<tr>
<td>Emission inside the perimeter</td>
<td>-25%</td>
<td>-9%</td>
<td>-13%</td>
</tr>
</tbody>
</table>

Comparison with the uncontrol case (inside + outside the gating area)
The MAGnUM’s team
Thank you for your attention

@LudoLeclercq
@erc_magnum