



## Fundamentals of Traffic Simulation: 145 (International Series in Operations Research & Management Science)

By Jaume Barceló

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The increasing power of computer technologies, the evolution of software engineering and the advent of the intelligent transport systems has prompted traffic simulation to become one of the most used approaches for traffic analysis in support of the design and evaluation of traffic systems. The ability of traffic simulation to emulate the time variability of traffic phenomena makes it a unique tool for capturing the complexity of traffic systems. In recent years, traffic simulation – and namely microscopic traffic simulation – has moved from the academic to the professional world. A wide variety of traffic simulation software is currently available on the market and it is utilized by thousands of users, consultants, researchers and public agencies. Microscopic traffic simulation based on the emulation of traffic flows from the dynamics of individual vehicles is becoming one of the most attractive approaches. However, traffic simulation still lacks a unified treatment. Dozens of papers on theory and applications are published in scientific journals every year. A search of simulation-related papers and workshops through the proceedings of the last annual TRB meetings would support this assertion, as would a review of the minutes from specially dedicated meetings such as the International Symposiums on Traffic Simulation (Yokohama, 2002; Lausanne, 2006; Brisbane, 2008) or the International Workshops on Traffic Modeling and Simulation (Tucson, 2001; Barcelona, 2003; Sedona, 2005; Graz 2008). Yet, the only comprehensive treatment of the subject to be found so far is in the user's manuals of various software products.

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## **Fundamentals of Traffic Simulation: 145 (International Series in Operations Research & Management Science) By Jaume Barceló Bibliography**

- Rank: #4389348 in eBooks
- Published on: 2011-01-06
- Released on: 2011-01-06
- Format: Kindle eBook

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## **Editorial Review**

### Review

From the reviews:

“This book presents a comprehensive review of some of the most popular traffic simulation packages used in practice and in academia around the world. ... an impressive collection and review of existing traffic simulation packages. ... a valuable resource for transport researchers in both academic and industrial sectors. ... the book attractive to readers from both the academic and the industrial sectors. ... In conclusion, this book is an outstanding review of traffic simulation ... .” (Andy Chow, *Environment and Planning B: Planning and Design*, Vol. 38, 2011)

“Fundamentals of Traffic Simulation presents the state of the art in traffic simulation in a useful and practical manner. ... This book will be useful for practitioners, students, and researchers. ... can serve as an introduction to traffic simulation, as a vehicle for selecting among the various tools, and as a comprehensive guide to current traffic simulation tools. A copy should be present in the libraries of every university’s civil engineering department and of every traffic consultancy team.” (Christine Buisson, *Interfaces*, Vol. 42 (5), September-October, 2012)

### From the Back Cover

The increasing power of computer technologies, the evolution of software engineering and the advent of Intelligent Transport Systems (ITS) worldwide has helped make traffic simulation one of the most used approaches for traffic analysis in support of the design and evaluation of traffic systems. The ability of traffic simulation software to emulate the time variability of traffic phenomena makes it a uniquely useful tool for capturing the complexity of traffic systems. While a wide variety of simulation software is available, no one book has presented a unified treatment of the subject.

*Fundamentals of Traffic Simulation* is the first book to provide practitioners and researchers with a comprehensive treatment of the state of the art of traffic simulation. Leading researchers worldwide provide up-to-date information on:

- Simulation as a well established and grounded OR technique and its specificities when applied to traffic systems.
- The main approaches to traffic simulation and the principles of traffic simulation model building.
- The fundamentals of traffic flow theory and its application to traffic simulation in Microscopic traffic modeling, Mesoscopic traffic modeling, and Macroscopic traffic modeling.
- The principles of Dynamic Traffic Assignment and its application to traffic simulation.

- The calibration and validation of traffic simulation models.

This important work will appeal to professionals, including transport consultants, managers in design firms and government, and even simulation software developers. It will also provide researchers with the first comprehensive overview of the subject, and can serve as a text or recommended reading in courses on traffic simulation and transportation analysis.

## **Users Review**

### **From reader reviews:**

#### **Ray Ellis:**

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