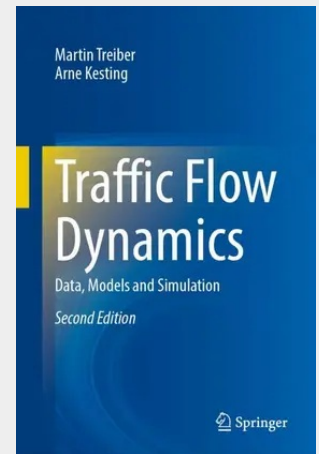


Traffic Flow Dynamics

Data, Models and Simulation

The new edition of this well-received textbook has been thoroughly updated and expanded. It now includes new chapters on pedestrian dynamics, non-lane-based and mixed traffic (e.g., in developing countries), dynamic navigation, map matching, and routing oscillations. Additional sections cover the complete specification of the Wiedemann models, the piecewise linear model, IDM+, as well as advanced topics like lane changing, multi-anticipation stability, hybrid and electric mobility, and fuel consumption modeling. This comprehensive and accessible textbook explores the dynamics and modeling of pedestrian and vehicular traffic flow. Previously documented only in specialized monographs, this interdisciplinary subject is now presented in a unified and reader-friendly format. Numerous figures and exercises with solutions support quick understanding and hands-on practice. The book is ideal for students in physics, traffic engineering, computer science, mathematics, and related interdisciplinary fields. It also serves as a valuable resource for professionals and offers material suitable for programming and simulation projects at the college and university level. Beginning with an overview of various traffic data types, the book delves into mathematical models of traffic flow, covering both macroscopic (density-based) and microscopic (vehicle-level) approaches. Dedicated chapters discuss traffic instabilities, model calibration, and practical applications such as travel-time estimation, intelligent transportation systems, and emissions modeling.

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