

Preface

This book is intended for use in a one-semester, first-year graduate course for students focusing in transportation engineering. It can also be used in a senior-level undergraduate class for civil engineering students focusing in transportation engineering. The book can be used as a reference by transportation professionals interested in a refresher on traffic flow theory and applications. Students using the book should have a basic knowledge of transportation engineering and highway design (having attended an introductory course in transportation) as well as a basic knowledge of algebra and statistics. It provides the fundamental principles of traffic flow theory as well as discussion of the application of those principles in the context of specific facility types (freeways, signalized, intersections, etc.). The book does not contain any significant amount of material that cannot be found elsewhere; rather it assembles and presents in a concise manner what the author considers are the most important principles and tools that today's transportation professionals specializing in transportation operations should be well versed in. The book considers advanced technologies to the degree that they are relevant to the principles of traffic flow. When deemed appropriate, the book provides references for obtaining additional information on specific technologies and topics relevant today. The text is supplemented by illustrative examples and applications, and it provides references and resources for further reading.

This book focuses on the traffic operational quality of a facility assuming that the demand for using a particular facility is known; travel demand forecasting or traffic assignment is not within the scope of the book. The emphasis of the book is on highway transportation, primarily because the vast majority of the research and applications of traffic flow theory to date have been automobile focused. Some discussion and examples related to pedestrian flow models are provided throughout the text. Given the recent emphasis on multimodal transportation, it is very likely that the next few years will continue to bring increasing emphasis on the operations of alternative modes as well as the interaction among various modes. Many of the mathematical principles of traffic flow as well as the tools described in this book can be modified and applied to other modes, considering the characteristics of the respective units of traffic (pedestrians, bicycles, buses, etc.).

I have been teaching courses in traffic flow theory for nearly 20 years. This book was developed based on the outline and course notes developed for these courses, which evolved over time to consider new research findings and implementation priorities. Most of the work to develop the book material was undertaken during a sabbatical from the University of Florida during the academic year 2010–2011.

I am indebted to the numerous students who attended my classes and significantly contributed in many different ways to the development of this book. I am particularly indebted to Dr. Cuie Lu, Dr. Alexandra Kondyli, and Ms. Barbara Martin who made significant contributions through their detailed reviews and comments. I am also thankful to the four anonymous reviewers who provided invaluable feedback on an earlier version of the manuscript.

Gainesville, FL, USA

Lily Elefteriadou

<http://www.springer.com/978-1-4614-8434-9>

An Introduction to Traffic Flow Theory

Elefteriadou, L.

2014, XX, 251 p. 97 illus., 79 illus. in color., Hardcover

ISBN: 978-1-4614-8434-9