



What Every Engineer Should Know about MATLAB® and Simulink®

By Adrian B. Biran

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MATLAB® can be used to execute many mathematical and engineering calculations, as well as a handheld computer can—if not better. Moreover, like many other computer languages, it can perform tasks that a handheld computer cannot. Compared to other computer languages, MATLAB provides many built-in functions that make learning easier and reduce prototyping time. Simulink® is a toolbox that extends the possibilities of MATLAB by providing a graphical interface for modeling and simulating dynamical processes.

Using examples from mathematics, mechanical and electrical engineering, and control and signal processing, **What Every Engineer Should Know About MATLAB® and Simulink®** provides an introduction to these two computer environments and examines the advantages and limitations of MATLAB. It first explores the benefits of how to use MATLAB to solve problems and then process and present calculations and experimental results. This book also briefly introduces the reader to more advanced features of the software, such as object-oriented programming (OOP), and it draws the attention to some specialized toolboxes.

Key features of the book include demonstrations of how to:

- Visualize the results of calculations in various kinds of graphical representations
- Write useful script files and functions for solving specific problems
- Avoid disastrous computational errors
- Convert calculations into technical reports and insert calculations and graphs into either MS Word or LaTeX

This book illustrates the limitations of the computer, as well as the implications associated with errors that can result from approximations or numerical errors. Using selected examples of computer-aided errors, the author explains that the set of computer numbers is discrete and bounded—a feature that can cause catastrophic errors if not properly taken into account. In conjunction with The Mathworks—marketers of MATLAB and Simulink—a supplementary website is presented to offer access to software implemented in the book and the script files used to produce the figures. This book was written by Adrian B. Biran of Technion -- Israel Institute of Technology, with contributions by Moshe Breiner, managing director of SimACon.

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Editorial Review

About the Author

Adrian B. Biran is on the faculty of mechanical engineering at the Technion-Israel Institute of Technology. He received his MSc and DSc from that same school, as well as a Diplomat Engineer degree from the Bucharest Polytechnic Institute. He worked extensively in design in Romania at IPRONAV-The Institute of Ship Projects, the Bucharest Studios and IPA-The Institute of Automation Projects. In Israel, he worked in design at the Israel Shipyards, and in research on Naval Architectural subjects at the Technion Research and Development Foundation. In parallel, he worked as a project instructor in Romania at the Technical Military Academy, in Israel at the Beer Sheva University (now the Ben Gurion University). Since 1972, Biran has served as an adjunct teacher in the Faculty of Mechanical Engineering of the Technion, and for the last 15 years as Adjunct Associate Professor. He has taught subjects including Machine Design, Engineering Drawing, and especially Naval Architecture. He has authored several papers on subjects such as computational linguistics and computer simulations of marine systems and subjects belonging to Ship Design. He also wrote a book on ships for popular audience and a book on Ship Hydrostatics and Stability published in English and Turkish. Together with Moshe Breiner he wrote a book on MATLAB® for Engineers that was published in three English, three German, two French, and two Greek editions.

Moshe Breiner graduated from the Scuola Normale di Pisa and the Università degli Studi di Pisa and obtained a Ph.D degree from the Harvard Graduate School of Arts and Sciences. He has worked in modeling and simulations and taught MATLAB®.

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