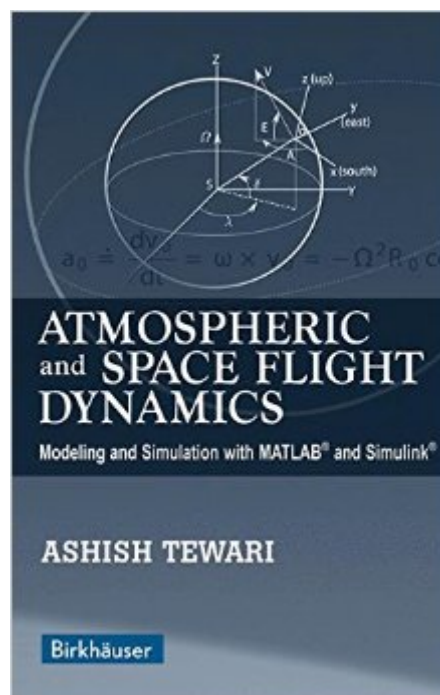# Atmospheric And Space Flight Dynamics: Modeling And Simulation With MATLAB® And Simulink® (Modeling And Simulation In Science, Engineering And Technology)

# Synopsis

This book offers a unified presentation that does not discriminate between atmospheric and space flight. It demonstrates that the two disciplines have evolved from the same set of physical principles and introduces a broad range of critical concepts in an accessible, yet mathematically rigorous presentation. The book presents many MATLAB and Simulink-based numerical examples and real-world simulations. Replete with illustrations, end-of-chapter exercises, and selected solutions, the work is primarily useful as a textbook for advanced undergraduate and beginning graduate-level students.

# Book Information

Series: Modeling and Simulation in Science, Engineering and Technology

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# Customer Reviews

I purchased this book as a reference for my aerospace engineering senior design project, in which I functioned as the dyanmics and control analyst. This book proved to be invaluable in every aspect of my responsibilities, particularly and most importantly in actual simulation of the equations of motion. The specific MATLAB codes provided are an excellent reference for writing your own scripts and functions for the numerical integration, and auxillary functions like the atmosphere and gravity programs were huge time-savers. If unfamiliar with the material, his step-by-step approach to the end goal of simulating a wide variety of atmospheric, transatmospheric, and spaceflight/orbital problems in both aero- and astronautical vehicles is perfectly structured. You will gain valuable insight into common dynamic modeling assumptions, both in 3 and 6 degree of freedom problems. I

could not have asked for a better text.The only possible suggestion for improvement I have is a greater number of even more in-depth, modern-type problems, like a recurring Space Shuttle example; this would cover a vertical-take off rocket with unique strcuture, aerodynamics, and staging into orbit, rendezvous with an orbiting station, lifting body reentry, and glide-to-target landing. Other possibilities include atmospheric simulations of hypersonic vehicles with ramjet/scramjet type propulsion. Still, these are just small suggestions in the face of what is an overall excellent publication; I would certainly buy future works from this author, particularly those with similar topics and examples as brought up above.

Author Ashish Tewari provides an excellent introduction to applications of MATLAB and Simulink to aerospace problems. In the process of providing these illustrative cases, Atmospheric and Spaceflight Dynamics provides a comprehensive treatment of both fundamental and modern flight mechanics formulations. These derivations, of course, have frequently been published in other texts, and in some cases they are accompanied by FORTRAN or C code, but Tewari's approach with MATLAB is a needed contribution. Moreover, the publishers have helped make this an accessible book with reasonable pricing. I'd say that the backcover description of the book's contents are essentially true.In his own introduction to the book Ashish Tewari explains his intent to provide "a unified approach to aircraft and spacecraft flight..." which is something that certainly grabs my attention. Like many people in industry I am very interested in reusable winged vehicles with perhaps both jet engines and rockets. These are vehicles which would certainly need that unified approach and, to interject, I would love to communicate more with the author about such ideas.Although I did say that there are similar introductions to flight mechanics available for students and others, I should add that the illustrative examples given in Tewari's book are quite distinctive and remarkable in themselves. Some might be familiar or basic, but many take on new problems to the textbook reader that one realizes are lurking out there in the field of aircraft or spacecraft development somewhere.Ashish Tewari also wrote a related textbook "Modern Control Design with MATLAB and Simulink", also with aerospace illustrative examples. This book is helpful as well and I think the two together could be treated as Volume I and Volume II. Though when Tewari introduced the subject of a vectoring a rocket through the atmosphere as its mass and inertia vary along with its aerodynamic loads... I think he has set himself up for writing Volume III.

Atmospheric and Space Flight Dynamics: Modeling and Simulation with MATLABÂ® and SimulinkÂ® (Modeling and Simulation in Science, Engineering and Technology) Atmospheric

Science, Second Edition: An Introductory Survey (International Geophysics) Jean Haines' Atmospheric Watercolours: Painting with Freedom, Expression and Style Dynamics AX Performance Optimization Guide: Fixing Troubles with Microsoft Dynamics AX and SQL Server Coral Reef Fishes: Dynamics and Diversity in a Complex Ecosystem (Interface Science and Technology) Aircraft Control and Simulation: Dynamics, Controls Design, and Autonomous Systems Military Flight Aptitude Tests, 5/e (Peterson's Master the Military Flight Aptitude Tests) Electronics in the Evolution of Flight (Centennial of Flight Series) LSC Understanding Space: An Introduction to Astronautics + Website (Space Technology Series) Understanding Space: An Introduction to Astronautics, 3rd Edition (Space Technology) Thermal Analysis with SOLIDWORKS Simulation 2016 and Flow Simulation 2016 Blockchain: The Comprehensive Guide to Mastering the Hidden Economy: (Blockchain Technology, Fintech, Financial Technology, Smart Contracts, Internet Technology) Choreographing Difference: The Body and Identity in Contemporary Dance (Studies. Engineering Dynamics Series;9) Shaping Space: The Dynamics of Three-Dimensional Design Software Engineering Classics: Software Project Survival Guide/ Debugging the Development Process/ Dynamics of Software Development (Programming/General) Compressible Fluid Dynamics (Advanced engineering series) Micromirror Technology for Maskless Lithography: Dynamics, Control and Fabrication Biological Modeling and Simulation: A Survey of Practical Models, Algorithms, and Numerical Methods (Computational Molecular Biology) Civil Engineering and the Science of Structures (Engineering in Action) The Art of Computer Systems Performance Analysis: Techniques for Experimental Design, Measurement, Simulation, and Modeling