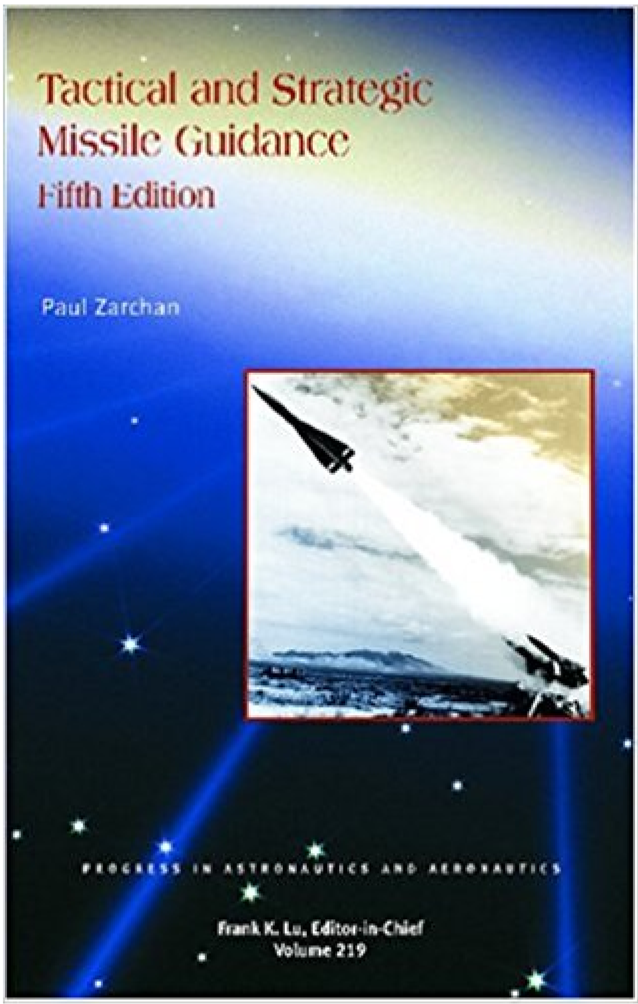
Tactical And Strategic Missile Guidance, Fifth Edition (Progress In Astronautics And Aeronautics)



Synopsis

The fifth edition of this best-selling title has three new chapters on important topics related to improving missile guidance performance and several important new concepts in the Appendix. The first new chapter presents several alternative ways of developing guidance laws numerically. These techniques can be used to derive more advanced guidance laws when the missile guidance system dynamics become very complex. An example is presented showing the advantages of a new advanced guidance law over more conventional guidance laws. Previous editions of the text have shown that intentional or unintentional spiraling maneuvers on the part of a tactical ballistic missile can also make it particularly difficult for a pursuing missile to hit. Estimating the target weave frequency is a critical component in advanced guidance laws that can be used to counter these spiraling threats. The second new chapter presents a linear Kalman filter bank approach, originally introduced in the 1960's, for accurately estimating the target weave frequency and improving missile guidance system performance. So far, all of the engagement simulations presented in this text have either been in one or two dimensions. This was done to make it easier for the reader to more easily understand all of the concepts presented in the text. The third new chapter provides several examples on how to convert previous engagement simulation code to three dimensions in both the tactical and strategic worlds. A simplified mapping database is included with the text in order to demonstrate how geographical context can be provided in three dimensional strategic engagement simulations. An example of one of the new concepts presented in the Appendix is the use of the discrete Fourier Transform for calculating the miss due to weaving targets. Together with numerous new examples and easy-to-understand graphs and explanations, readers with varied learning styles will find "Tactical and Strategic Missile Guidance" a staple for any aerospace engineer's library. Companion software, in both Macintosh and IBM-compatible versions, contains source code listings in FORTRAN, C, and MATLAB[registered] languages. A detailed set of appendices not only serves as a user's guide but also explains how the text's FORTRAN source can easily be converted to either C or MATLAB. The conversion technique plus detailed source code examples will be tools of interest to all engineers, regardless of whether you specialize in missile guidance or other aerospace-related fields.

Book Information

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Customer Reviews

Paul Zarchan has a BSEE degree from the City College of New York and an MSEE degree from Columbia University. He has more than 35 years' experience in the missile guidance and control field and has worked as Principal Engineer for Raytheon, served as Senior Research Engineer with the Israeli Ministry of Defense, was a Principal Member of the Technical Staff at the Charles Stark Draper Laboratory and is currently a member of the technical staff at MIT Lincoln Laboratory. He is co-author of Fundamentals of Kalman Filtering: A Practical Approach (ISBN 978-1-56347-455-2) and the instructor for the popular AIAA professional development courses on strategic and tactical missile guidance and Kalman filtering.

Excellent book which guides the reader though the evolution of missile guidance algorithms. Has a very good section on the history of guided missiles. Includes many Fortran codes for simulating different types of 2-D guidance algorithms, also includes sections on tactical zones, boosters, and strategic intercepts. Excellent addition to any guidance law student's library.

This is an excellent pretty comprehensive text on tactical and strategic missile guidance. The focus is almost exclusively on air / ballistic interceptor missile guidance (i.e., hitting a moving / maneuvering target) and there's lots of really good examples and insights into real challenges and issues. The author starts with the basics (ideal guidance with perfect measurements and no lag/dynamics) and walks the reader through more and more complexity (and realism) (e.g., lag / dynamics, parasitic challenges, maneuvering/uncooperative targets, etc.). The author provides excellent coverage of key contributors to interceptor missile performance like state estimation, sensor capabilities and limitations (although focuses mainly on radar), and the airframe / flight control system (for an aero control interceptor). The author's newer chapters (from the 1st edition up to the current) put a lot more emphasis on strategic / ballistic target intercept challenges and there are no other texts on the market that can match this for content / depth of content. I like some of the newer chapters in this edition like the one on higher order "matched" interceptor guidance (i.e., Alternative Approaches to Guidance Law Development). This text is a must have for anyone who wants to really learn this topic or one day wants to become "the expert" in this technically challenging field. This is the recommended text at my company for missile guidance theory training.Christopher - Tucson

Professor Zarchan's text is an outstanding treatment of missile guidance and control. The derivation of proportional navigation and other missile control laws provides insight and the additions for ballistic missiles are particularly relevant for today's missile specialists. The computer programs provide a quick reference, and enhance the derivations. A must have for developers, testers, or anyone with an interest in missile guidance and control.

The matlab scripts do not follow the matlab programming style,and many of the buildin functions of matlab should be used for simplicity and efficiency,such as ode45.There is a possible error in the 2nd chapter .On page 13.The closing velocity is defined asVc = -d(Rtm)/dtThe author says that" In other words,from calculus we know that the closing velocity will be zero when Rtm is a minimum(i.e.the function is either minimum or maximum when its derivative is zero)."But the function must be contineous and *differentiable*.Just think a case with target and missile both on x axis,and missile fly with a constant speed.You will see that the Rtm function is not differentiable at x=0.

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