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Make analytical results more effective

Modern Missile Guidance

Includes software programs designed by the author

Rafael T. Yanushevsky

Research & Technology Consulting, Bethesda, Maryland, USA

An innovative presentation of the theoretical aspects of modern missile guidance

Written by an expert with more than 30 years of experience, **Modern Missile Guidance** contains new analytical results, obtained by the author, that can be used for analysis and design of missile guidance and control systems. This book covers not just new methods nor is it merely a compilation of older methods, although it includes both. The book discusses, in a logical progression, with its clear elucidation of the guidance laws, the entire field from missile dynamics to modeling and testing missile guidance and control systems.

In contrast to existing books that discuss very simple and often unrealistic guidance system models, this book presents missile guidance models that describe more precisely the dynamics of the missile flight control system, making analytical results more effective in practice. The analysis of missile guidance system models in the time-domain and in the frequency-domain allows the generation of different guidance laws that supplement each other.

Taking modern, rigorous approach that leads to improved performance in missile guidance applications, the book examines new guidance laws, and corresponding algorithms for generating and testing these laws, and includes effective new software programs developed by the author. The author provides an innovative presentation of the theoretical aspects of modern missile guidance that quite possibly cannot be found in any other book. It delineates new ideas that, once crystallized, will significantly improve missile systems performance.

Catalog no. 62263, September 2007, 240 pp.
ISBN: 978-1-42006-226-7, $159.95 / £92.00

FEATURES

- Describes a new class of guidance laws implementing parallel navigation based on the Lyapunov approach
- Covers the frequency approach to missile guidance analysis and design
- Analyzes guidance law performance under stochastic inputs
- Elucidates a new approach that can be used for integrated missile guidance and control system design as a modernization of the existing missile systems
- Reviews computational programs that can be used to test missile guidance laws
- Includes practical software programs that utilize new algorithms based on the frequency approach

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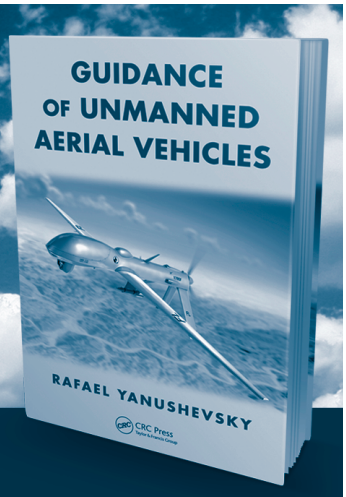

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Written by an expert with more than 30 years of experience, **Guidance of Unmanned Aerial Vehicles** contains new analytical results, taken from the author's research, which can be used for analysis and design of unmanned aerial vehicles guidance and control systems. This book progresses from a clear elucidation of guidance laws and unmanned aerial vehicle dynamics to the modeling of their guidance and control systems.

Special attention is paid to guidance of autonomous UAVs, which differs from traditional missile guidance. The author explains UAV applications, contrasting them to a missile's limited ability (or inability) to control axial acceleration. The discussion of guidance laws for UAVs presents a generalization of missile guidance laws developed by the author. The computational algorithms behind these laws are tested in three applications—for the surveillance problem, the refueling problem, and for the motion control of a swarm of UAVs. The procedure of choosing and testing the guidance laws is also considered in an example of future generation of airborne interceptors launched from UAVs.

The author provides an innovative presentation of the theoretical aspects of unmanned aerial vehicles' guidance that cannot be found in any other book. It presents new ideas that, once crystallized, can be implemented in the new generation of unmanned aerial systems.

Catalog no. K12322, March 2011, 376 pp.
ISBN: 978-1-4398-5095-4, $179.95 / £114.00

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- Provides a comparative analysis of new guidance laws as well as established guidance laws
- Focuses on computational algorithms and software usage in missile and UAV guidance
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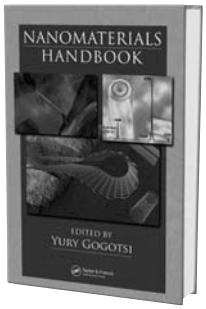

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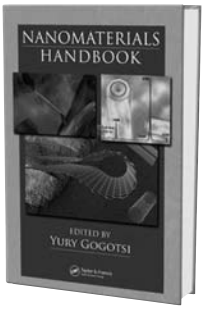

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Donald E. Carlucci
U.S. Army Picatinny Arsenal, Dover, New Jersey, USA
Sidney S. Jacobson
Retired, Chester, New Jersey, USA

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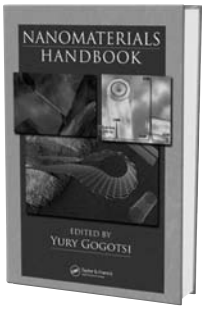
ISBN: 978-1-4200-6618-0, $144.95 / £92.00



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Travis S. Taylor
U.S. Army Space and Missile Defense Command, Huntsville, Alabama

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