

Linear Systems Theory

By João P. Hespanha

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Linear systems theory is the cornerstone of control theory and a well-established discipline that focuses on linear differential equations from the perspective of control and estimation. In this textbook, João Hespanha covers the key topics of the field in a unique lecture-style format, making the book easy to use for instructors and students. He looks at system representation, stability, controllability and state feedback, observability and state estimation, and realization theory. He provides the background for advanced modern control design techniques and feedback linearization, and examines advanced foundational topics such as multivariable poles and zeros, and LQG/LQR.

The textbook presents only the most essential mathematical derivations, and places comments, discussion, and terminology in sidebars so that readers can follow the core material easily and without distraction. Annotated proofs with sidebars explain the techniques of proof construction, including contradiction, contraposition, cycles of implications to prove equivalence, and the difference between necessity and sufficiency. Annotated theoretical developments also use sidebars to discuss relevant commands available in MATLAB, allowing students to understand these important tools. The balanced chapters can each be covered in approximately two hours of lecture time, simplifying course planning and student review. Solutions to the theoretical and computational exercises are also available for instructors.

- Easy-to-use textbook in unique lecture-style format
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Editorial Review

Review
"This is a splendidly written textbook; in fact, the next time I teach linear systems theory, I intend to use it. It covers the right amount of theory and presents the material at a perfect level for students. It has many exercises, most of which are well suited for beginning engineering graduate students."**--Alan J. Laub,** ***Elements of Computation Theory***

From the Back Cover

"*Linear Systems Theory* gives a good presentation of the main topics on linear systems as well as more advanced topics related to controller design. The scholarship is sound and the book is very well written and readable."**--Ian Petersen, University of New South Wales**

"This book provides a sound basis for an excellent course on linear systems theory. It covers a breadth of material in a fast-paced and mathematically focused way. It can be used by students wishing to specialize in this subject, as well as by those interested in this topic generally."**--Geir E. Dullerud, University of Illinois, Urbana-Champaign**

About the Author
Joao P. Hespanha is professor of electrical engineering at the University of California, Santa Barbara, where he is associate director of the Center for Control, Dynamical Systems and Computation.

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