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**Título:** Mathematical Control Theory

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**Sinopsis**

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This textbook introduces the basic concepts and results of mathematical control and system theory. It is geared primarily to an audience consisting of mathematically advanced undergraduate or beginning graduate students. In addition it can be used by engineering students interested in a rigorous, proof-oriented systems course that goes beyond the classical frequency-domain material and more applied courses. The minimal mathematical background that is required of the reader is a working knowledge of linear algebra and differential equations. The book covers what constitutes the common core of control theory: the algebraic theory of linear systems, including controllability, observability, feedback equivalence, and minimality; stability via Lyapunov, as well as input/output methods; ideas of optimal control; observers and dynamic feedback; parameterization of stabilizing controllers (in the scalar case only); and some very basic facts about frequency domain such as the Nyquist criterion. Kalman filtering is also introduced briefly through a deterministic version of "optimal observation. This text is unique in its emphasis on foundational aspects. While covering a wide range of topics written in a standard theorem/proof style, it also develops the necessary techniques from scratch and does not assume any background other than basic mathematics. In this second edition, additional chapters and sections have been written dealing with time optimal control of linear systems, variational and numerical approaches to nonlinear control, nonlinear controllability via Lie-algebraic methods, and controllability of recurrent nets and of linear systems with bounded controls. A large number of errors and typos have been corrected, and a table of symbols has also been added.

Content Level » Research