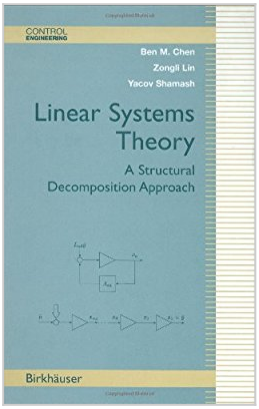

Linear Systems Theory: A Structural Decomposition Approach (Control Engineering)

By Ben M. Chen, Zongli Lin, Yacov Shamash

Linear Systems Theory: A Structural Decomposition Approach (Control Engineering) By Ben M. Chen, Zongli Lin, Yacov Shamash

Includes MATLAB-based computational and design algorithms utilizing the "Linear Systems Toolkit."

All results and case studies presented in both the continuous- and discrete-time settings.

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Editorial Review

From the Back Cover

This text is the first comprehensive treatment of structural decompositions of various types of linear systems, including autonomous, unforced or unsensed, strictly proper, non-strictly proper, and descriptor or singular systems. Structural properties play an important role in the understanding of linear systems and also provide insight to facilitate the solution of control problems related to stabilization, disturbance decoupling, robust and optimal control. Applications can be extended to industrial process control, aircraft and ship control, process automation control, and many other types of engineering systems.

The authors employ a unique structural decomposition approach to break down an overall system into various subsystems, each with distinct features. The simplicity of these subsystems and their interconnections lead to deep insight about the design of feedback control systems for desired closed-loop performance, stability, and robustness. All results and case studies are presented in both continuous- and discrete-time settings. Exercises, as well as MATLAB-based computational and design algorithms utilizing the *Linear Systems Toolkit*, are included to reinforce and demonstrate the concepts treated throughout the book.

Topics covered include:

* Basic Concepts of Linear Systems Theory

* Decomposition of Unforced and/or Unsensed Systems, Proper Systems and their Properties

* Decomposition of Descriptor Systems and their Properties

* Cascade and Inner-Outer Factorizations

* Structural Assignment through Sensor/Actuator Selections

* State Feedback Control with Time-Scale and Eigenstructure Assignment

* Disturbance Decoupling with Static Output Feedback

Linear Systems Theory may be used as a textbook for advanced undergraduate and graduate students in aeronautics and astronautics, applied mathematics, chemical, electrical and mechanical engineering. It may also serve as a valuable self-study reference for researchers and engineering practitioners in areas related to systems and control theory.

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Warren Damron:

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