



## Linear Continuous-Time Systems

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### Features

- Discovers the existence of the system full transfer function matrix  $F(s)$  and defines and determines it for  $IO$ ,  $ISO$  and  $IIO$  systems (the new class of the systems introduced in the book).
- Establishes the full block diagram technique and the full system matrix  $P(s)$  both based on the use of  $F(s)$ .
- Introduces new dynamical system and control tools, which are not available in existing texts.
- Explores the concept and definition of the  $IO$  systems and of the  $IIO$  systems state and uses it in the stability study.
- Provides the understanding, knowledge, and capability to analyze and design all three classes of the systems.

### Summary

This book aims to help the reader understand the linear continuous-time time-invariant dynamical systems theory and its importance for systems analysis and design of the systems operating in real conditions, i.e., in forced regimes **under arbitrary initial conditions**. The text completely covers  $IO$ ,  $ISO$  and  $IIO$  systems. It introduces the concept of the **system full matrix**  $P(s)$  in the complex domain and establishes its link with the also newly introduced **system full transfer function matrix**  $F(s)$ . The text establishes the full block diagram technique based on the use of  $F(s)$ , which incorporates the Laplace transform of the input vector and the vector of all initial conditions. It explores the direct relationship between the system full transfer function matrix  $F(s)$  and the Lyapunov stability concept, definitions and conditions, as well as with the BI stability concept, definitions, and conditions. The goal of the book is to unify the study and applications of all three classes of the of the linear continuous-time time-invariant systems, for short systems.