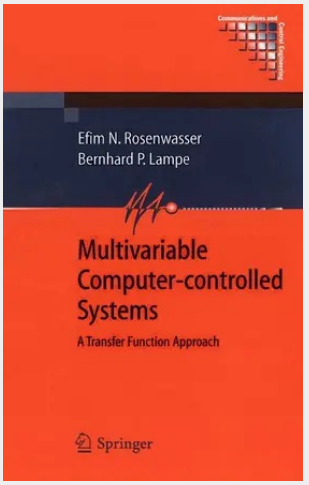
Rosenwasser / Lampe

Multivariable Computer-controlled Systems

A Transfer Function Approach



Although the transfer function approach is widely used in classical control theory, computer-controlled continuous-time processes are a very important subset of periodic sampled-data systems which are not treatable using ordinary transfer functions.

The authors show how parametric transfer functions, which incorporate time-dependence, can be used to give a complete exposition of analysis and design methods for multi-input, multi-output (MIMO) sampled-data systems.

Multivariable Computer-controlled Systems is divided into three parts:

- Preliminary algebraic material necessary in later chapters.

- Control problems, important in their own right but also having a substantial bearing on what follows.

- Frequency methods for the investigation of MIMO sampled-data systems (parametric discrete-time models; stability; stochastic methods; H optimization and L design).

Appendices covering basic mathematical formulae and two MATLAB toolboxes round out this self-contained guide.

Algebraic Preliminaries.- Polynomial Matrices.- Fractional Rational Matrices.- Normal Rational Matrices.- General MIMO Control Problems.- Assignment of Eigenvalues and Eigenstructures by Polynomial Methods.- Fundamentals for Control of Causal Discrete-time LTI Processes.- Frequency Methods for MIMO SD Systems.- Parametric Discrete-time Models of Continuous-time Multivariable Processes.- Mathematical Description, Stability and Stabilisation of the Standard Sampled-data System in Continuous Time.- Analysis and Synthesis of SD Systems Under Stochastic Excitation.- H2 Optimisation of a Single-loop Multivariable SD System.- -Design of SD Systems for 0 < t < ?.

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