

Preface

It is well known that robust H_∞ control and filtering are important issues for systems. In recent years, the linear matrix inequality (LMI) technique has been widely used to solve the robust H_∞ control and filtering problems for uncertain linear systems with polytopic uncertain parameters and/or norm bounded uncertain parameters.

Although a large number of design methods have been developed to deal with the robust H_∞ control and filtering problems for both continuous-time and discrete-time uncertain linear systems, the design problem of output feedback H_∞ controllers cannot be formulated in the framework of LMI. In general, the problem can be represented as a bilinear matrix inequality (BMI) problem. However, the BMI problem is nonconvex and difficult to obtain solution. To obtain LMI-based conditions for designing output feedback H_∞ controllers, some studies have to impose constraints on system matrices. In summary, those results are limited and cannot be applied to general control systems.

This monograph aims to present some new results on robust output feedback H_∞ control and filtering for uncertain linear systems. It lists an LMI decoupling approach, and the main results of this monograph are expressed in a unified LMI framework, which will provide an effective foundation for the future research. It is primarily intended for graduate students in control and filtering, but can also serve as a valuable reference material for researchers wishing to explore the area of control and filtering of linear systems.

The background required of the reader is knowledge of basic control system theory, basic Lyapunov stability theory, and basic LMI theory.

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