Advances in linear matrix inequality methods in control

Abstrak

Linear matrix inequalities (LMIs) have recently emerged as useful tools for solving a number of control problems. This book provides an up-to-date account of the LMI method and covers topics such as recent LMI algorithms, analysis and synthesis issues, nonconvex problems, and applications. It also emphasizes applications of the method to areas other than control.

The basic idea of the LMI method in control is to approximate a given control problem via an optimization problem with linear objective and so-called LMI constraints. The LMI method leads to an efficient numerical solution and is particularly suited to problems with uncertain data and multiple (possibly conflicting) specifications.

Since the early 1990s, with the development of interior-point methods for solving LMI problems, the LMI approach has gained increased interest. One advantage of this technique is its ability to treat large classes of control problems via efficient numerical tools. This approach is widely applicable, not only in control but also in other areas where uncertainty arises. LMI techniques provide a common language for many engineering problems. Notions now popular in control, such as uncertainty and robustness, are being used in other areas through the use of LMIs. This technique is particularly attractive for industrial applications. It is well suited for the development of CAD tools that help engineers solve analysis and synthesis problems.