

Mechatronic systems : analysis, design and implementation

Boukas, El-Kebir, author

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Abstrak

This book deals with the analysis, the design and the implementation of the mechatronic systems. Classical and modern tools are developed for the analysis and the design for such systems. Robust control, H-Infinity and guaranteed cost control theory are also used for analysis and design of mechatronic systems. Different controller such as state feedback, static output feedback and dynamic output feedback controllers are used to stabilize mechatronic systems.

Heuristic algorithms are provided to solve the design of the classical controller such as PID, phase lead, phase lag and phase lead-lag controllers while linear matrix inequalities (LMI) algorithms are provided for finding solutions to the state feedback, static output feedback and dynamic output feedback controllers.

The theory presented in the different chapters of the volume is applied to numerical examples to show the usefulness of the theoretical results. Some case studies are also provided to show how the developed concepts apply for real system.

Emphasis is also put on the implementation in real-time for some real systems that we have developed in our mechatronic laboratory and all the detail is provided to give an idea to the reader how to implement its own mechatronic system.