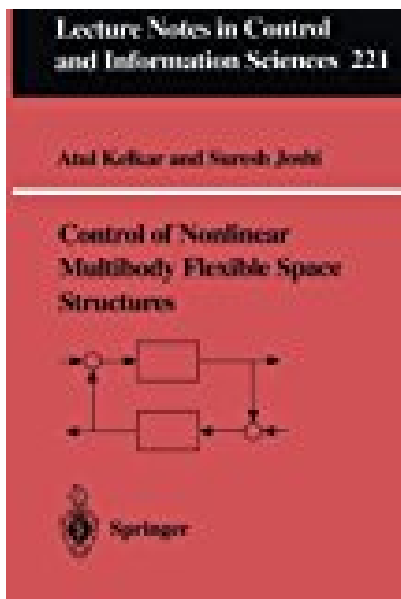


Control of Nonlinear Multibody Flexible Space Structures Lecture Notes in Control and Information Sciences



BOOK DETAILS

- Author : Atul G. Kelkar
- Pages : 144 Pages
- Publisher : Springer
- Language : English
- ISBN : 3540760938

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BOOK SYNOPSIS

Addressing the difficult problem of controlling flexible spacecraft having multiple articulated appendages is the aim of this volume. Such systems are needed for space mission concepts including multi-payload space platforms and autonomous space-based manipulators. These systems are characterised by highly nonlinear dynamics, flexibility in members and joints, low inherent damping, and modeling uncertainty. A complete nonlinear rotational dynamic model of a generic multibody flexible system is derived, and is shown to possess certain passivity properties. The main result is a class of passivity-based nonlinear and linear output feedback control laws that enable globally stable closed-loop manoeuvres. The control laws are robust to parametric uncertainties, unmodeled uncertainties, and in some cases, actuator and sensor nonlinearities. All results given are also applicable to flexible terrestrial manipulators.

CONTROL OF NONLINEAR MULTIBODY FLEXIBLE SPACE STRUCTURES LECTURE NOTES IN CONTROL AND INFORMATION SCIENCES

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