
Perturbation Techniques for Flexible Manipulators

**Anthony R. Fraser
Ron W. Daniel**



Kluwer Academic Publishers

Perturbation Techniques For Flexible Manipulators

Mike Jess



Perturbation Techniques For Flexible Manipulators:

Perturbation Techniques for Flexible Manipulators Anthony R. Fraser, Ronald Daniel, 1991-06-30 A manipulator or robot consists of a series of bodies links connected by joints to form a spatial mechanism Usually the links are connected serially to form an open chain The joints are either revolute rotary or prismatic telescopic various combinations of the two giving a wide variety of possible configurations Motive power is provided by pneumatic hydraulic or electrical actuation of the joints The robot arm is distinguished from other active spatial mechanisms by its reprogrammability Therefore the controller is integral to any description of the arm In contrast with many other controlled processes e.g. batch reactors it is possible to model the dynamics of a manipulator very accurately Unfortunately for practical arm designs the resulting models are complex and a considerable amount of research effort has gone into improving their numerical efficiency with a view to real time solution 32 41 51 61 77 87 91 In recent years improvements in electric motor technology coupled with new designs such as direct drive arms have led to a rapid increase in the speed and load carrying capabilities of manipulators However this has meant that the flexibility of the nominally rigid links has become increasingly significant Present generation manipulators are limited to a load carrying capacity of typically 5-10% of their own weight by the requirement of rigidity For example the Cincinnati Milicron T3R3 robot weighs more than 1800 kg but has a maximum payload capacity of 23 kg

Perturbation Techniques in the Dynamics and Control of Flexible Manipulators A. R. Fraser, R. W. Daniel, University of Oxford. Department of Engineering Science, 1988

Perturbation Techniques in the Dynamics and Control of Flexible Manipulators

A. R. Fraser, 1988 **Robust Control Algorithms for Flexible Manipulators** Kshetrimayum Lochan, Binoy Krishna

Roy, Bidyadhar Subudhi, Santhakumar Mohan, 2024-10-13 Various modelling and control of two link flexible manipulators are presented in this book The lumped parameter modelling method and the assumed modes method modelling are comprehensively reviewed The book also reviews the trajectory tracking problem and tip trajectory tracking problem along with the suppression of tip deflection of the links An exponential time varying signal and a chaotic signal are considered as the desired trajectories The identical non-identical slave manipulator is synchronised with the controlled master manipulator so that the slave manipulator indirectly follows the desired manipulator

Flexible Manipulators Yanqing Gao, Fei-Yue Wang, Zhi-Quan Zhao, 2012-04-12 The Intelligent Systems Series comprises titles that present state of the art knowledge and the latest advances in intelligent systems Its scope includes theoretical studies design methods and real world implementations and applications Flexible manipulators play a critical role in applications in a diverse range of fields such as construction automation environmental applications and space engineering Due to the complexity of the link deformation and dynamics the research effort on accurate modeling and high performance control of flexible manipulators has increased dramatically in recent years This book presents analysis data and insights that will of particular use for researchers and engineers working on the optimization and control of robotic manipulators and automation systems Government and industry

groups have specifically stressed the importance of innovation in robotics manufacturing automation and control systems for maintaining innovation and high value added manufacturing Discusses the latest research on the quantitative effects of size shape mass distribution tip load on the dynamics and operational performance of flexible manipulators Presents unique analyses critical to the effective modeling and optimization of manipulators hard to find data unavailable elsewhere

Robots Manipulators John X. Liu, 2005 This book deals with control and learning in robotic systems **Flexible Robot Manipulators** M. Osman Tokhi, Abul K.M. Azad, 2008-05-20 This book discusses the latest developments in modelling simulation and control of flexible robot manipulators Coverage includes an overall review of previously developed methodologies a range of modelling approaches including classical techniques parametric and neuromodelling approaches and numerical modelling simulation techniques **Astrodynamics 1995**, 1996 *Modelling and Control of Compliant and Rigid Motion Systems* American Society of Mechanical Engineers. Winter Annual Meeting, 1991 **Experiments in Modelling and End-point Control of Two-link Flexible Manipulators** Celia Marie Oakley, Stanford University. Department of Aeronautics and Astronautics, 1991 *IEEE International Conference on Systems Engineering*, 1990

Dynamic Systems and Control, 1994 A Delayed Adaptive Inverse Method for End Point Motion Control of Flexible Beams Guo-Ben Yang, 1991 **Dynamics of Continuous, Discrete & Impulsive Systems**, 2002 **Proceedings of the ... IEEE International Conference on Control Applications**, 1996 **Proceedings IECON '91: Robotics, CIM and automation. Emerging technologies**, 1991 *Applied Mechanics and Materials II* Seung Bok Choi, Yun Hae Kim, Prasad Yarlagadda, 2013-12-19 Selected peer reviewed papers from the 2013 International Conference on Applied Mechanics and Materials ICAMM 2013 November 23 24 2013 Zhuhai China The Second IEEE Conference on Control Applications, September 13-16, 1993, Le Meridien Vancouver Hotel Vancouver, British Columbia, 1993 This conference focuses on the applications of control theory and control technology Papers included in this proceeding are from academia and industry

Sensor Fusion, 1992 IEEE International Conference on Systems Engineering, August 9-11, 1990, Vista International Hotel, Pittsburgh, Pennsylvania, 1990

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