

ASTRODYNAMICS SYMPOSIUM (C1)  
Multibody Dynamics (8)

Author: Dr. Zhiyong Chen  
China, chenzhiyong0203@foxmail.com

Prof. Li Chen  
Fuzhou University, China, Chnle@fzu.edu.cn

ROBUST CONTROL FOR COORDINATED MOTION OF SPACE-BASED ROBOT SYSTEM WITH  
UNCERTAIN PARAMETERS AND EXTERNAL DISTURBANCES**Abstract**

The coordinated control for the base's attitude and arms of space-based robot system with uncertain parameters and external disturbances is considered in this paper. With the linear momentum conservation of system, the kinematics and dynamics of system are analyzed. It is shown that the generalized Jacobi matrix and dynamic equations of the system can be linearly dependent on a group of inertial parameters. Based on the results, a robust control and a robust adaptive combined control for the coordinated motion in joint space and inertia space are proposed, respectively, and then the stability of the overall system is analyzed through Lyapunov direct method. The first presented approach can guarantee the uniform ultimate boundedness of the tracking error. For the second control scheme, the global uniform asymptotic stability of the system is established. Both control schemes proposed need not measure the position, velocity and acceleration of the floating base with respect to the orbit because of an effective exploitation of the particular property of the system dynamics. The simulation results are exhibited to support the theoretical issues.