

Plenary Speech III

15:15 – 16:00, Tuesday, July 11

CYT LT1

Multiple-Loop Kinematic Mechanisms and Structures



Professor Bing Li

Harbin Institute of Technology, Shenzhen, China

Abstract

Recently the applications of multiple close-loop kinematic mechanisms and structures have covered a wide variety in manufacture, aerospace, new energy equipment etc., as high stiffness and great load capacity could be achieved by using the kinematic mechanisms with containing multiple close-loop kinematic chains comparing to the traditional purely open-loop mechanisms. In the field of

manufacturing, the spatial multi-loop parallel mechanism can be used as a parallel kinematic equipment, which could implement high performance machining, assembly and measurement tasks. In space, as the transport rockets used today have limited storage space, large space structures are usually designed as deployable mechanisms that can be transformed from a compact folded configuration to the predetermined expanded form of a complete stable structure capable of supporting loads. Related research work on large space mechanisms and structures has focused on type synthesis deployable single-loop mechanisms, mobile assembly of the large deployable mechanisms, the closed-loop equation of the multi-loop deployable mechanisms, etc. More recently, due to the advantage of light quality, large aperture and high precision, more and more attentions have paid to the mesh deployable antenna, extensive research in terms of mobility analysis, design of deployable mechanism, form-finding and precision adjustment of cable net, deployment dynamics modeling and ground experiments of the principle prototype is highlighted. In this talk the research outputs in the Aerospace Mechanisms and Control Lab of HIT Shenzhen are introduced. The related technologies play an important supporting role for lunar exploration, the implementation of the manned space tasks and other scientific research.

Biography

Prof. Bing Li received his B.S. degree and M.S. degree in mechanical engineering from Liaoning Technical University, China, in 1993 and 1995, and the Ph.D. degree in Dept. of Mechanical Engineering from The Hong Kong Polytechnic University, Hong Kong, in 2001. He was the Engineering Director of Maxbright Engineering Ltd. in Hong Kong, from 2002 and 2003. He was an Associate Professor at mechanical engineering in Harbin Institute of Technology Shenzhen Graduate School, Shenzhen, China from 2003-2006, and was a Professor since 2006. He is currently the Dean of the School of Mechanical Engineering and Automation, Harbin Institute of Technology at Shenzhen, China. His research interests include robotics and mechanisms, parallel kinematic machines and mechanical vibration and control. Prof. Bing Li is selected as an Innovation Talent in Science and Technology, National Ten-thousand-talent Program of China in 2016. He authored a book entitled Fixture Design of Automotive Body Assembly (Science Press, China, 2014) and is Currently an Associate Editor of Intelligent Service Robotics(Springer). He was a recipient of State Technological Invention Award of China in 2014 and Natural Science Award of Shenzhen in 2016, and has been awarded Best Paper Award in Biomimetics in 2014 IEEE International Conference on Robotics and Biomimetics, and is offered the Outstanding ME Alumni Award of the Hong Kong Polytechnic University in 2017.