

Title:

Hybrid Motion Simulation for Orbital Space Robots

Abstract:

Hybrid Motion Simulation (HMS), also called a hardware-in-the-loop simulation, is one promising method to emulate three dimensional relative motion of space robots with respect to a certain target in micro gravity environment, for example, capturing a target satellite with an on-orbit space robot or a minor-body touchdown exploration robot. The HMS consists of numerical simulation that calculates dynamic motion of the entire robotic system due to impact or collision and hardware that is designed as same as a real space robotic system and is affected by physical impact or multi-point contact. The advantage of HMS is that it does not require a complex contact dynamics model in the numerical simulation to emulate the dynamic motion due to the impact or contact. Therefore, we can easily analyze the motion of the space robot suffering impact or contact and even propose new concept of the control of the robotic system through the experiment with the HMS. The presentation shows HMS for several applications such as a touchdown simulation for minor body exploration and a target grasping by an on-orbit space robot.

Presenter:

Satoko Abiko, Dr.Eng.  
Assistant Professor

Department of Mechanical Systems and Design,  
Tohoku University,  
Aramaki-aza Aoba 6-6-01,  
980-8579, Sendai, Miyagi,  
JAPAN

Tel.: ++81-22-795-6973

Fax: ++81-22-795-6971

E-mail: [Satoko.Abiko@ieee.org](mailto:Satoko.Abiko@ieee.org)

[abiko@space.mech.tohoku.ac.jp](mailto:abiko@space.mech.tohoku.ac.jp)