


Motion Control for Industrial Fields		
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Research Topics
<ul style="list-style-type: none"> •Haptic robot system for medical fields •Force Sensor-less force control system •Vibration suppression control system •High-speed and high-accuracy position control system

Research Seeds

● **Medical robot system using bilateral control theory**

In recent years, realization of haptic systems is desired strongly in fields of medical treatment and expert skill acquisition. Minimally invasive surgery (MIS) has attracted attention for about ten years. MIS considers a patient's quality of life (QOL) greatly. Especially, development of endoscope surgery is superior to conventionally performed surgical operations. Its influence on society and economy is extremely strong. Furthermore, many researchers have strived to develop a medical robotic system.

However, the operator receives no feedback of tactile sensation. The operator obtains tactile sensation solely by visual feedback only. The present medical robot, which lacks this haptic function, has many attendant risks. Tactile sensation is important for surgery in various fields.

Many studies have specifically examined bilateral control to attain the vivid tactile feedback from the remote environment. In a conventional bilateral robot, much research has emphasized force sensors to detect force. Sensors using a strain gauge are well-known, but present many difficulties that affect performance of bilateral control.

To overcome these difficulties, this research proposes a sensor-less force control method using a reaction torque observer. As a result, the proposed bilateral system solves the force sensor's problems. This algorithm has wide application in industrial fields.

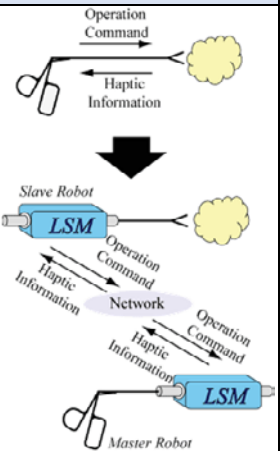


Fig. 1 Forceps robotic system.



Fig. 2 Bilateral robot system.

Related Technology

- High-speed and high-accuracy position control technology
- Force sensor-less technology
- Force control technology