

รูปแบบ Abstract (บทคัดย่อ)

Project Code : MRG56-0572

(รหัสโครงการ)

Project Title : High Sensation of Haptic Feedback in Robot-Assisted Device based on

(ชื่อโครงการ) **Acceleration Control with Compensation of Mechanical Resonance**

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(ระยะเวลาโครงการ)

This research proposes a specially designed acceleration sensor based load side disturbance observer (ALDOB) with Kalman filtering technique that can be used to estimate the external force on the load side for multi mass system. The proposed observer employs an acceleration sensor and optical encoder to perform contact force measurement. Since acceleration sensors can be implemented in a small area on the end-effector, it is considered to be suitable for the real applications. By using the proposed observer, it is not necessary to identify the nominal spring coefficient.

In the sensorless force control loop, the proposed ALDOB observer can be utilized with resonance ratio control to suppress high-frequency vibrations of spring. Since the optimal parameters are designed by using coefficient diagram method (CDM), the resonance ratio control can ensure good robustness of the force control. The parameters of resonance ratio control for two mass system and three mass system, which are representative of many physical systems are also analyzed by using the proposed method. Moreover, this proposed approach could also be applied for other multi mass system. Our experimental results of the controller's performance including its vibration were in good accord with theory and simulations.

Keywords : (คำหลัก) External force estimation, Kalman filter, Multi mass system, Vibration