

## **Inverse Disturbance Response Decoupling Control of an Optical Table**

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### **Abstract**

This paper proposes the design and control of an optical table, which needs to isolate two main vibration sources: load disturbances from the machine and ground disturbance from the environment. Because the suspension settings to suppress these two disturbances are conflicting, we applied disturbance response decoupling (DRD) techniques to independently treat these two vibration sources. In previous studies, we used passive suspension elements to isolate the ground disturbances, and applied active actuators to improve the load responses. However, the soft passive structures might result in large vibrations to load disturbances and damage the precision machines. Therefore, in this paper we propose an inverse DRD structure that uses stiff passive elements to suppress the load disturbances and applies the active actuators to improve the ground responses. The designed controllers are implemented for experimental verification. Based on the results, the proposed inverse DRD control is deemed effective.