

Vibration Control of EPL System by Disturbance Response Decoupling

Fu-Cheng Wang, Yu-Chia Tsao and Jia-Yush Yen

Abstract

This paper utilizes Disturbance Response Decoupling (DRD) techniques to suppress vibrations of an Electron Beam Projection Lithography (EPL) system. Due to the resolution requirement, vibration control of EPL systems is increasingly important. Generally speaking, vibration control should cope with two kinds of disturbances, namely load disturbances from the machine and floor disturbances from the environment. In practice, anti-vibration tables are usually utilized to insulate disturbances, by either active or passive control algorithms. However, the controller design is complicated due to the conflicting requirements for the two disturbances. Therefore, we apply DRD techniques to deal with the control requirements independently. We use the passive isolators to reduce the floor disturbances, and the active isolators to cope with the load disturbances. Furthermore, a new mechanical network component, called Inerter, is considered in the design of passive isolators to further improve the system performance. From the simulation results, the proposed control strategies are deemed effective.