

Vibration Control of an Electron Beam Projection Lithography System Employing Disturbance Response Decoupling Techniques

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

Abstract

This paper applies a newly developed technique, called disturbance response decoupling (DRD) [1], 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, two kinds of disturbances, namely load disturbances from the machine and floor disturbances from the environment, need to be considered for an EPL system. It is noted that the controller design is complicated due to the conflicting requirements for the two disturbances [2]. Therefore, we applied DRD techniques to deal with the performance requirements independently. The work was carried out in three parts. At first, passive isolators were used to reduce the floor disturbances. Then an active component was applied to improve the system response to load disturbances. Finally, the system was integrated to verify the overall performance. From the results, the proposed control strategies are deemed effective.